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Textile World

A McGRAW-HILL PUBLICATION

FEBRUARY 28, 1938

ANNUAL REVIEW AND FORECAST NUMBER

Review and Forecast Section

Feast and Famine..... 55
Textile Business Takes Nose Dive but Ends Year with Pretty Good Record.

Machinery Sales..... 56
1937 Figures Top 1929 Despite Recent Slump.

Glances Fore and Aft..... 59
Economic Survey of Industry's Branches Shows 1937 a Toboggan; 1938 May Improve.

Cotton Manufacture..... 63
General Acceptance of Long-Draft Roving, and Introduction of New High-Speed Slasher.

Woolen and Worsted..... 65
Improvements in Mule Spinning and Increased Use of Staple Rayon.

Rayon and Silk..... 67
Developments in Throwing, Warp Preparation and Weaving; Ingenious Leasing Device.

Knitting Progress..... 69
Completely Automatic Full-Fashioned Operation Nearer; Other Machines Improved.

Processing Developments..... 71
Greatest Progress in Finishing Wool Goods.

Mill Engineering..... 73
Higher Fuel Costs Focus Attention on Methods for Increasing Power-Plant Efficiency.

Practical Helps..... 119
Kinks for Operating Executives, Culled from the 1937 Issues of TEXTILE WORLD.

Industrial Relations Section

Employee Relations..... 79
Dramatic Progress Has Been Made in Textile Industry in Last 25 Years.

Wages and Hours..... 82
Spectacular Social Changes in Textile Mills in Last Five Years.

Textile Education..... 84
Its Past Development Unique; Its New Experiment Unparalleled.

Comfort and Safety..... 86
Employees' Well-Being the Incentive for Major Improvements in Textile Plants.

The Mill Village..... 88
Why It Exists, What It Really Is, and What Problems It Involves

The Mill Store..... 90
Is It an Asset or a Liability?—An Analysis of Its History and Present State.

Typical Company Achievements

Kendall Co. 92
Marshall Field & Co. 92
Pepperell Mfg. Co.. 93
Avondale Mills 94
Chatham Mfg. Co... 95
Cone Group of Mills 98
American Woolen Co. 99
Assabet Mills 99
Berkshire Knitting..100
U. S. Rubber Mills..101
Pacific Mills.....104
Manville-Jenckes ...105
West Point Mfg. Co. 106
Martha Mills.....107
Firestone Mills.....110
Stillwater Worsted..111
Carlton Yarn Mills.111
Hudson Silk Hosiery 112
Joanna Cotton Mills.113
Wiscassett Mills Co..116
Parker School Dist..116
Stonewall Jackson..118

Social Activities Told in Pictures

Kendall, Startex, Fairfax, Pacolet, Martha, etc. 95
Southern Bleachery, Rowan, Judson, Rocky Mount, Springs and Others.....102
Drayton, Union Bleachery, Cone, and Others.108
Wateree, Brandon, Victor Monaghan, Pacolet, Joanna, and Others.....114

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Textile World

FEBRUARY 28, 1938

DOUGLAS G. WOOLF, *Editor*

ANNUAL REVIEW AND FORECAST SECTION

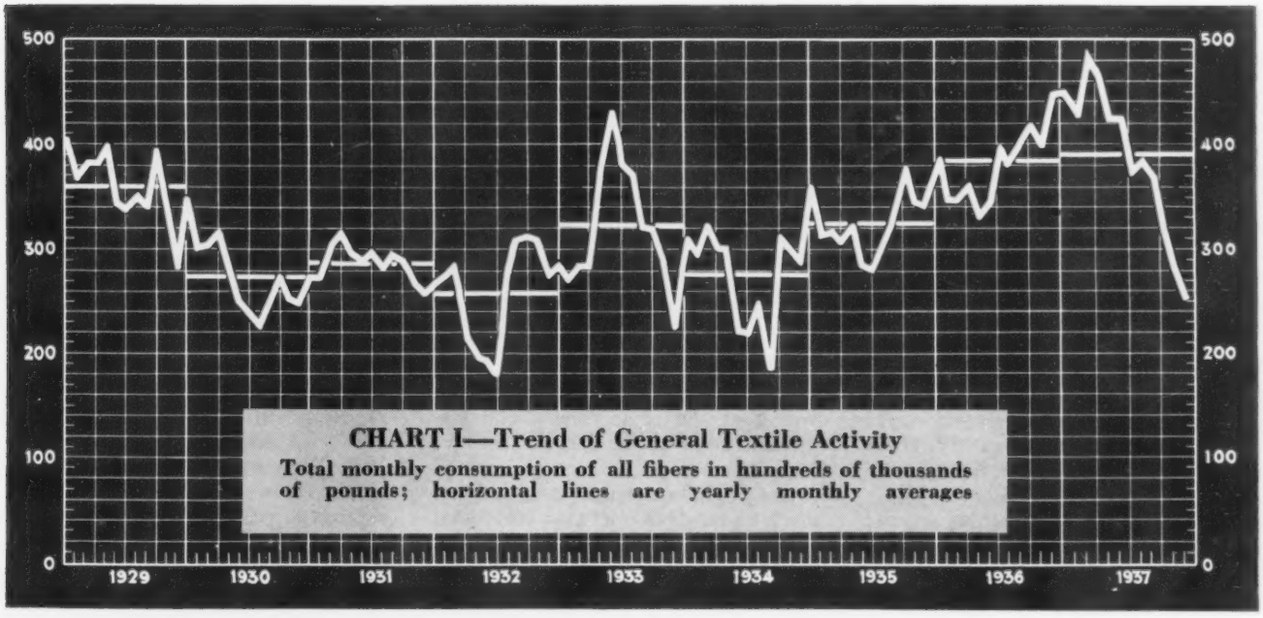


CHART I—Trend of General Textile Activity

Total monthly consumption of all fibers in hundreds of thousands of pounds; horizontal lines are yearly monthly averages

Feast and Famine

Textile business takes nose-dive but ends year with pretty good record

THERE'S ONE THING to be said for the textile industry: it has some swell half-years. If ever it could put two of them together in one calendar year, it would have something!

Take a look at Chart I for example. The last half of 1936 and the first half of 1937 would make a handsome couple. The combination sets an all-time record for textile mill activity. Maybe the industry should change its fiscal year!

But when we add the last half of 1937 to the first half, the total is less impressive. As our readers may have heard, there was a slump in the latter months of the year. In fact, we don't think we are too rough on the movement if we call it a nose-dive. Once again, a look at Chart I will help the reader to understand what we are talking about.

Despite this year-end grief, however, the year ended up as a very respectable specimen, having just a slight edge (1% up) on 1936, which itself was no slouch. From a production stand-point, 1937 was 25% above the so-called "normal" (1923-25 average) and 9% above 1929! The reason for this showing was the remarkable activity of the first half-year. At the end of that period, the rate was 25% above the corresponding period of 1936. Consequently, even though the collapse in the fall wiped out this gain, the net was still a good one.

Here is the record for the depression, recovery and recession periods:

(1923-1925 average = 100)

1929	115
1930	89
1931	93
1932	83
1933	104
1934	90
1935	105
1936	124
1937	125

Textiles vs. General Business

Probably the average textile manufacturer thinks he has had a monopoly on grief. It will help him to look at Chart II where textile production is charted against general industrial pro-

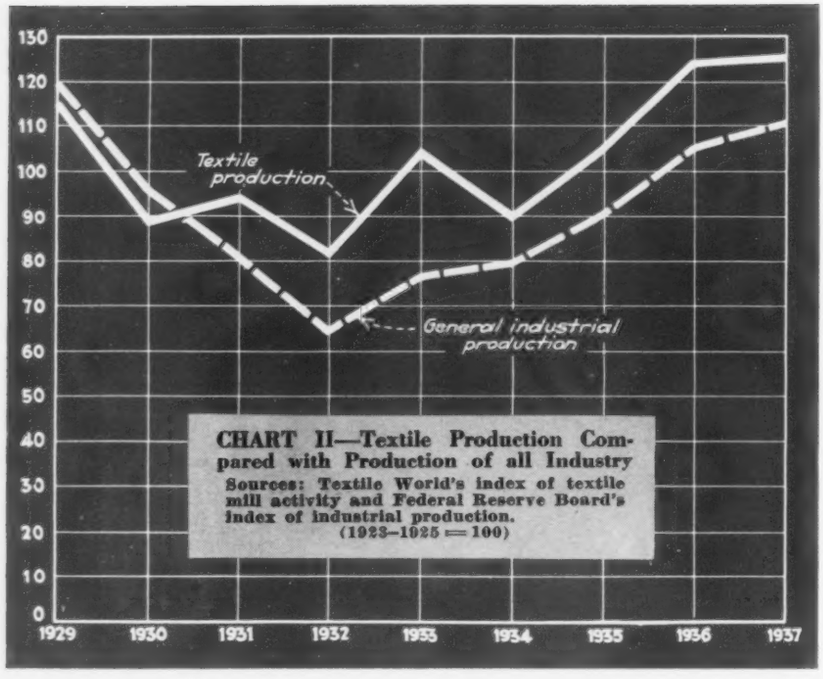


CHART II—Textile Production Compared with Production of all Industry
Sources: Textile World's index of textile mill activity and Federal Reserve Board's index of industrial production. (1923–1925 = 100)

duction. It will be noted that the former stepped out in front in 1931 and has stayed there ever since. In 1937, the textile index was 25% above 1923-25 while the index for general industry was only 10% above.

In fact, there was nothing private about this slump last year. It was a free-for-all. True, the cotton division got a start all its own, when raw cotton collapsed, starting in August. But soon the general grief, resulting from the stock market decline and the ensuing jitters, made it unanimous.

It is easy, of course, to look back now and point out the mistakes made in 1937. The rate of production in the first half of the year had plenty of the joy-ride element in it. This writer could be smug and refer to his editorial suggestion early last spring that the industry "heed the caution light before it gets pinched for going through a red one." However, the further memory of how wrong we were in August makes us decide to call the whole thing quits.

In fact, 1937 was one tough year on prophets! Our best contacts, who have had an accuracy percentage of around 90, went completely sour. Just before hell broke loose last August, we found that the majority of textile people were expecting a bulge. In fact, actual indications of revived interest in the market indicated that this was due. And within a few weeks, the whole business blew to pieces.

We go into this, not because the reputation of a prophet is of any great importance. In fact, anyone who sticks his neck out that way has to expect an occasional blow. However, it is not to be expected that practically all prophets should go wrong at the same time. The significant point about this, as we have indicated before, is that sources of statistical information, particularly of an integrated character, were found to be woefully lacking. We say they were *found* to be so. That is misleading. Actually, they were *known* to be so long before last year, but little has been done about it. 1937 dramatized the lack, and should force action in 1938. It's one of the big jobs ahead.

We Hate to Do This, But . . .

It can easily be imagined that, in view of what was mentioned above, this writer is a little gun-shy about predicting for 1938. In fact, his impulse is to call the whole thing off. However, this forecasting business gets into your blood; it's not a thing that you can take or leave alone. So here goes.

There is little doubt that the 1938 curve will be the reverse of 1937—that is, that the peak will be in the last half instead of in the first half. Our feeling is that the best one could expect would be a total activity equal to 1937—and that the chances are for a decline, say, about 10%. However, that would still be 12½% above the 1923-25 average.

This time last year we said: "If the textile industry reaches the same rate of activity in 1937 that it did in 1936, it will be putting on a swell performance. If it drops off say 10%, it will still have a good year." It did the former. About the same statement can be made for 1938. We hope it turns out to be as accurate as was that for 1937.

Progress by Branches

As for the divisions of the industry, cotton was the only fiber which registered increased consumption in 1937; its use was 5% above that of 1936. Wool was off 12%, silk off 7%, filament rayon off 12%. The fibers shared the collapse in the last half of the year. The high of cotton consumption for the year was in March, and the low in December—the latter being 45% off from the former. Wool's low, in November, was 63% off from the high in March. Silk use in December was about 50% less than January. Rayon, in the last month of the year, showed a drop of 48% from the first month.

For 1938, we believe, the reverse will be true.

Machinery Sales

Top 1929 despite slump in latter part of year

TEXTILE WORLD'S *true story of the sales curve of textile machinery and allied products continues here with the 1937 instalment. This authoritative survey, made possible by the confidential information supplied us by the manufacturers, started with 1929 and therefore the data in hand cover the depression, recovery, and now the recession, periods.*—Editor

BY THE middle of last year it looked as if sales of textile machinery and allied products were all set to make a record far above 1929. Then that branch of the industry caught the same bug that infected all business—and expectations were gradually deflated. Despite this disappointing end, however, total 1937 sales were higher than 1929 for the first time since that year. Here are the principal facts revealed by TEXTILE WORLD'S annual survey:

1. Dollar volume of sales in 1937 was 11% over 1936, and 40% above 1935.

2. The 1937 volume was the highest on record in this survey, being 4% above 1929, the first year of the compilation. (*See Chart III.*)

3. The following table of index

numbers shows the trend of textile machinery sales from 1929 to date, based on 1929 as 100:

1929.....100	1933.....56
1930.....67	1934.....63
1931.....57	1935.....74
1932.....39	1936.....94

1937 . . . 104

4. By branches of the industry, the following percentages show the percentage increases in 1937 over 1936: Preparatory, spinning and weaving equipment, 15%; knitting machinery, 3%; bleaching, dyeing and finishing machinery, 4%; auxiliary equipment, plus accessories and supplies, 16%. These percentages compare with an increase of 11% for the industry as a whole, as noted above. It should be mentioned, incidentally, that there were some wide differences in figures reported by individual firms; this is usually true in a year when a sudden change of fortune sets in, as in 1937.

What About 1938?

As an editor, we should like to skip our usual summary of manufacturers' predictions for the coming year—but as a reporter we feel compelled to include it. The truth is that most of these makers of textile machinery and allied products feel either definitely gloomy or else gloomily indefinite. Thus, 46% confess pessimism, 33% are on the fence, and only 21% are optimistic. However, the average expectation of those brave enough to express their hopes (or fears) in percentages was only 6% below 1937. Last year the average prediction was 12½% above 1936, and the final result was 11% above. If sales in 1938 come as close to prediction as they did last year, this will still be a good year.

In quoting some of the opinions expressed in the letters received, we give first position to those which mention the Administration, since that is the most colorful form of writing nowadays.

● "While we continue to feel that the textile industry is increasingly conscious of the necessity for the modernization and replacement of obsolete equipment, it is hard to feel optimistic about 1938 in the face of such Washington antics as the undistributed profits tax, reciprocal trade treaty talks, White House conferences, Ickes-Johnson blasts, production control, ever-unbalanced budget, abolishment of monopolies, abolishment of holding companies, government competition to set up foot-long yardsticks; and talk, talk, talk, mostly contradictory, always knocking down an already battered straw man, and all futilely trying to cure what it caused. We have learned that the most efficient gears are those that make the least noise, and until Washington learns the same lesson we don't expect to become 'economic royalists.'"

● "As for the prospect for textile machinery sales in 1938, with Washington blowing hot and then cold so business is upset all the time, and with Hull letting down the tariff for cheap labor goods, we don't think it looks good."

● "As for the outlook for the textile industry in 1938, it is rather difficult to make any predictions. It seems nowadays that business looks to Washington, and what Washington will do is more or less unpredictable."

● "In our opinion we believe that the governmental reform now being considered cannot be settled before the early part of 1938 and therefore there seems to be no substantial reason why business should regain confidence for some months to come; however, the conferences now being held between business heads and the President in Washington may bring about a better understanding between government, labor and business. If the result of these conferences does the good that it should we believe there will be a quicker start back to normal."

● "Except for more broken confidences, the outlook for textile machinery in 1938 looks favorable to us. We could even assume that in our particular line of textile machinery, there might develop a demand exceeding 1936. However, it is hard to find anyone who believes in any statements being made by the present Administration."

● "The writer has been in active business for some 40 years and during that time he does not recall a single period in which we suffered such an entire lack of new orders as took place during the last four months of 1937, or any period when we had to curtail our employment to the extent that we have in this Roosevelt Depression."

● "We believe that once the business man is assured of being permitted to run his own business without being molested by the 'Boys down in Washington' everything will be O.K. We believe the talk of calling a special session several weeks previous to the time they convened had its effect on slowing up business. Then the speeches later on by several of the members of the President's group also had their ill effects. Somehow we believe that they are beginning to see the light of day and we are looking forward to a time when we will again be busy and happy."

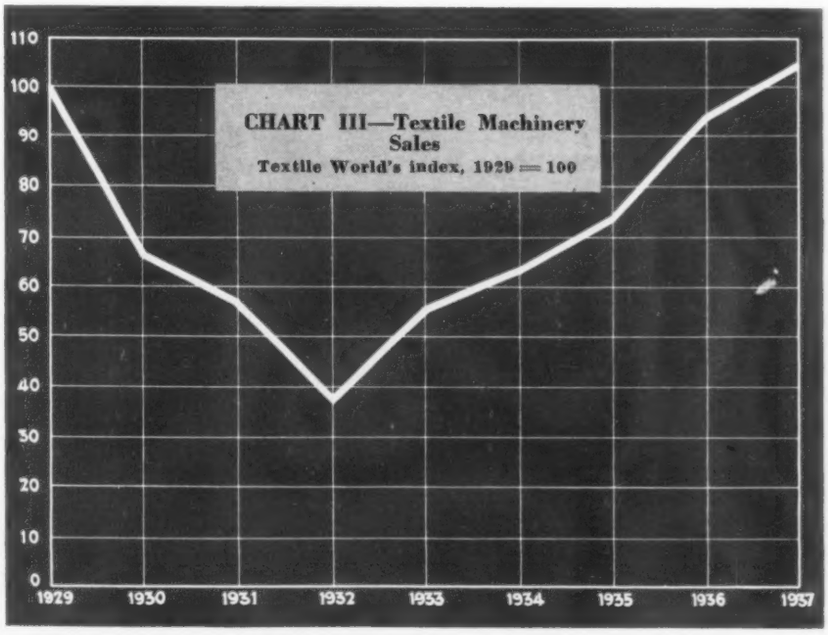
Here are some other, more general comments on the outlook:

● "With reference to the outlook for 1938, I feel very optimistic and believe that the present recession will be short-lived. I can see no reason for a prolonged recession at this time, due to the fact that the short busy period which we experienced during 1937 does not warrant a slackening up—when we consider the magnitude of the depression. We have been heartened during the last few days by a few inquiries from the southern mills and we know of a considerable number of mills which intend to purchase machinery but seem to be holding up through the fear of some unseen bogy."

● "As to the outlook for 1938, we do not see a basis for great improvement in the near future, although January has been considerably better than December, which was very low indeed."

● "So far as 1938 is concerned, it is extremely difficult to say. There is practically no business available at the moment. There are plenty of mills indicating that they would like to buy machines, but they seem to be beset by the same fear, or indecision, that seems to govern business generally throughout the country. I believe that we shall come out all right, but when business will start and whether the pick-up will be enough in the latter part of the year to offset the lack of business which is evident at the present, it is difficult to say."

● "It is not easy to express an opinion as to the outlook for 1938. A great deal depends upon the political situation. If this clears up there is no reason why 1938 should not be just as good as 1937



and, from our standpoint, possibly better."

● "In regard to the machinery sales for 1938, I do believe that the year will show some worth-while improvements, particularly so if prices on raw materials and finished products will strengthen, and if the textile manufacturers will get together in an effort to stabilize their prices, because I do believe that has been one of the most disturbing factors in the textile industry."

● "In regard to textile machinery sales for '38, we wish to state that at the present time there is not very much activity, and we do not look for much until early spring. In fact if conditions continue as at present, 1938 will be far from a banner year."

● "While the textile industry at present is passing through a somewhat violent depression I firmly believe we are going to see a considerable pickup in the next few months. There is already a marked interest in new equipment and many mills have completed modernization plans which will be put into effect as soon as a new dollar can be obtained for an old one. The cloth market is gradually strengthening and machinery inquiries are more active than they have been for several months past."

● "At the present time, the outlook does not seem very bright for textile machinery sales in our particular line; but with an improvement in the textile business in general, we may do as well as last year."

● "With regard to the outlook for sales in 1938, we attended a meeting a week or two ago where a very moderate and conservative speaker referred to the 'crazy' textile industry. There may be just enough truth in this so that our opinion as to the outlook for the textile industry is that it will be as usual alternately in the doldrums and booming. Just when the dips and booms will come is quite beyond us."

● "We believe that business in the woolen mills will commence to improve after the middle of the year, but we expect that as usual the textile machinery business will lag behind—so that we see very little prospect for machinery sales during 1938. The mechanical improvements in machinery for woolen mills have been very great during the last ten years, but with the present disturbed political conditions that does not seem to be enough to persuade manufacturers to buy.

● "With regard to the outlook for sales of textile machinery this year, 1938, it is rather enigmatic. Our back-log was worked off just before Christmas. We started the new year at zero. Inquiries are being received right along. Whether the interest reflected by these inquiries will fade away, remains to be seen, but, if only a portion of them results in business, it will be encouraging to say the least. Some with whom we have talked, are emphatic in their statements they will buy no dyeing equipment this year. These notions may be dissipated. In this country we are getting away with a very poor start, or, I might state, no start at all. In Canada, the picture with us is different. We continue to enjoy a nice business there, and a few days ago, received a very nice order."

● "Frankly, I am somewhat pessimistic about the possibility for textile machinery sales in 1938. Due to the probable large inventory losses that most mills have had to take on cotton, I believe it will be quite a few months before this branch of the textile industry is in a receptive mood toward more buying. However, as general business improves by mid-summer, as I expect it will, I believe the attitude in the textile industry will improve materially and I look for a continual pick-up in business to that industry throughout the balance of 1938. I think we both know one thing that would help general business throughout the country a great deal. You have expressed this thought a good many times in your editorials and I have been in entire accord with them."

● "As we look ahead this year we believe that if we are able to bring our sales within 10 to 15% of 1937 sales, we will be doing a good job. Naturally, this is simply a guess and with upset world-wide conditions, most anything is apt to happen, which would throw our calculation off."

● "It is our hope that 1938 will, on the whole, prove to be about the same as last year, but it must be admitted that present indications are such that we cannot help but feel somewhat pessimistic for the immediate future."

● "The outlook today is not nearly as bright as it was a year ago and we are rather afraid there will not be much pick-up until about the middle of the year."

● "In looking over our prospect files we feel that this year should hold well to last year. There seems to be a general feeling in the trades that we all need something and will get it just as soon as we see the 'Green Light.'"

● "In regard to our opinion as to the outlook of textile machinery sales in 1938 we are under the impression that we will do as well, possibly better, than 1937. It seems to us the outlook within the last few days has brightened up considerably over the period extended from Dec. 1, 1937, up to the present time."

● "Now in regard to prospects for 1938 we have estimates out for even greater volume of systems in cotton textiles and rayon textile mills than we had for 1937, but at the present time everyone of these prospects is held up and we feel they will only go ahead after there has been an appreciable pick-up in business in the textile mills. As a straw in the wind, however, the southern mills talk much more optimistically of business pick-up and going ahead than do the New England mills."

● "As a prophet, I'm no good. However, discounting the political angle it looks as though we would have a very slow first quarter at least, with a strengthening of sales as we get into the second period. Probably in our own case, our recovery will be reflected by the attitude of the rayon machinery purchasing companies, as these fellows probably have plenty of money and are probably going to release some of it before the smaller finishing plants do."

● "My own view of 1938 is a slow getaway, with increasing volume as the year progresses or, to put it another way, where 1937 was an excellent first six months I believe that 1938 will be a fair last six months."

● "As regards 1938, I think it's anyone's guess as to when business confidence is going to revive sufficiently, so that our customers will commence buying machinery. At the present time, and that means the last three months, the buying has been at the lowest ebb I have known it for a great many years. We have quite a number of prospects of people who have made up their minds they wish to go forward and make purchases, but at the present time, until there is a little better confidence in our general business conditions, they are holding off and refusing to purchase anything."

And here are a few comments on miscellaneous, but important, phases:

● "There should be a very decided desire on the part of the efficient ones to survey their plant equipment and take advantage of the modern high-speed machinery, which will give the same or better finish to their goods as their present equipment. Such survey should show them the economy of purchasing new machines, or revamping the old ones where possible, so that with less effort and less expense and less floor space involved, they can produce more goods. It seems to me that where a better product can be sold to the purchaser at a lower cost, the manufacturer (and that is as true for ourselves as for the cotton mills) should be able to create his own market, and should succeed in spite of general depression. Our own efforts are being bent toward redesign to produce better machines at lower costs. Our advertising is going to emphasize that now is the time to put the plant in order while the volume of goods is low and interruptions to the flow of such goods would do a minimum harm. I know that this has been your own editorial policy and presume that more of your editorials will be in that strain in the months to come. We shall be very much interested in reading your annual number when it comes out."

● "Give the textile trade a little health as to sales and prices and that trade will readily spend money for plant equipment. Advances made in the design of textile equipment have been notable and the alert manufacturer must take advantage of these improvements if he is to remain alert and in line with his forward competitors."

● "My own feeling is that if the undistributed profits tax is either repealed in toto or so amended as to give some encouragement in the purchase of new machinery, we might see a fairly early revival of business. In the next two or three months, however, we do not look for very much change. And looking ahead, another disturbing factor is to what extent the Reciprocal Trade Treaty now being discussed with Great Britain will affect manufacturing in this country. With the shortened hours which we have and the raised wages, the results to be expected from depriving us of all protection are fairly obvious."

Glances, Fore and Aft

Economic survey of textile industry's branches shows 1937 a toboggan; 1938 may improve

1937, Year of Contrasts in Cottons

EXACTLY one year ago in this column appeared the following statement: "There is no doubt that 1937 will be a good year for cotton textiles, but some of the more conservative mill operators fear reckless operation is going to bring 'good times' to an end earlier than necessary." And look at what happened!

Business in 1937 began with a song in its heart ("Happy Days Are Here Again") which by late spring reached a full crescendo. Prices of gray goods, cotton yarn, and raw cotton touched a high around April, as did margins, index numbers and other economic barometers. Spindle activity passed 146% single-shift capacity in March and April, after hovering close to that figure for several months previously. Realistic mill men saw the inevitable and counseled slowing down, but the great majority was too hungry for profits to listen. Then the decline set in, gradual at first; but it grew sharper as fall approached. Soon doleful notes were added by the general business recession, and the merry song of spring became a funeral dirge.

Yet the concert was not as bad as many seemed to think at its close. Observant critics believe that the early magnificence of the performance more than made up for the weak ending. In fact, taking everything into consideration 1937 will probably go down as one of the "good" years in the history of the industry.

Beneath the current situation there seems to be a feeling that the bottom has been reached, and that the stage is set for some good business by late spring. This is partly due to a combination of factors, including curtailed production, retail movement, and some pickup in sales of gray goods. There is also the hope that general business will improve and that the Washington situation will begin to show signs of stabilization. Taking all of this into consideration, most so-called prophets look for 1938 to have a slow beginning and good ending, with the average somewhere around that of 1936 and 1937—both good years and well above the 1924-31 "normal" average.

Monthly cotton consumption in the United States in 1937 averaged better than 618,000 bales, 5% more than the previous year and nearly 25% more than two years ago. The peak was reached in March with 777,000 bales, and the low in December with 433,000.

Prices of raw cotton, based on the behavior of New York spot cotton during the year fluctuated in a range of 7.46c. The drop from a high of 15.17c. in April to a low of 7.79c. in November was one of the most spectacular and complicating developments of the year. Monthly average was 11.45c., as compared with 12.07c. in 1936, a loss of 0.62c. Chief reason for the drop was the 18,500,000-bale crop, largest on record. The 1936 crop produced only 11,900,000 bales, and the 1935, 10,248,000 bales.

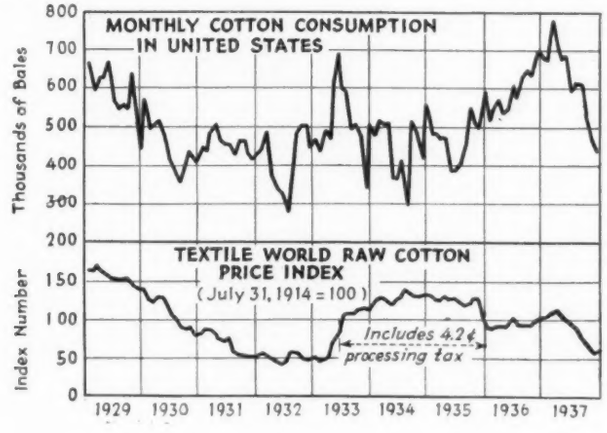
Spindle activity by months, corresponding to fluctuations in cotton consumption, was at an average of 127.5% single-shift capacity, as compared with 116.7% the previous year, an increase of 10.8%. The average number of spindles active per month was 24,081,000, as compared with 23,379,000 in 1936, approximately 701,000 or 3% more. Average hours operated per spindle in place was 294 as compared with 270 in 1936, an increase of 24 hours or 8%; an increase of 37% since 1935.

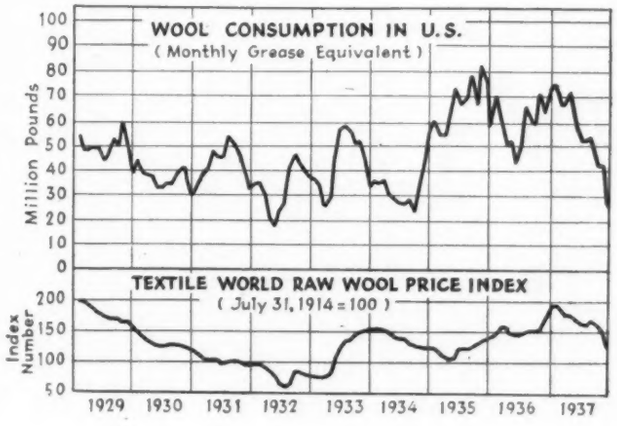
Cotton-textile mills made money during 1937, and especially during the first half of the year. Numerous mills reporting earnings for fiscal years ending in the fall, showed statements from 30 to 50% higher than for the previous year. Dividend payments were generous. However, those mills with fiscal years ending around Jan. 1 had a different picture as the last quarter was almost a total loss.

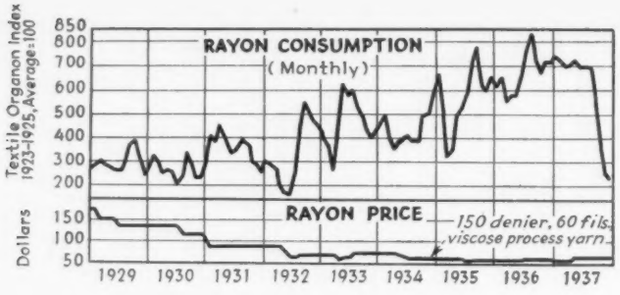
The average monthly price of 38½-in., 64x60, 5.35 yd. print cloth was just a little less than 6½c., fluctuating from a high of 8⅛c. in February to 4⅜c. in December. Yarns behaved somewhat more erratically, but in the same trend.

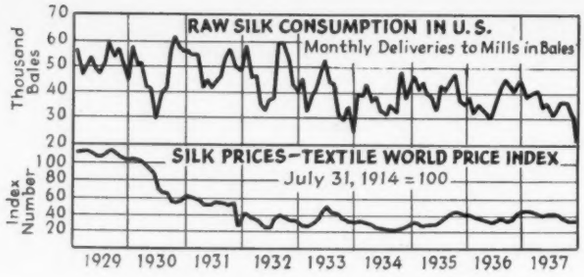
High and Low Records in Wool Goods

RECORDS, both on the high and low side, were made during 1937 in the wool goods market. Prices and activity made their highs in the first quarter and their lows in the last quarter—and between top and bottom there was a difference of 30 to 60%. There were profits in the first half of the year in wool manufacture, which were turned into deficits








RAW SILK CONSUMPTION IN U. S.
Monthly Deliveries to Mills in Bales
Thousand Bales
SILK PRICES—TEXTILE WORLD PRICE INDEX
July 31, 1914 = 100
Index Number
1929 1930 1931 1932 1933 1934 1935 1936 1937

on the books of many companies by the losses of the last half.

In looking ahead for 1938 the market is starting off at a point which may indicate thorough liquidation and gives hope for strengthening and improvement if the slightest encouragement is offered. Mill stocks of wool at the end of the year were 38% less than at the start, and their piece goods supplies were not considered burdensome. Supplies in the hands of manufacturing and retailing clothiers and women's garment houses were somewhat of an enigma and possibly to be the subject of further liquidation. Constructive curtailment by wool textile mills has been a helpful action.

In early 1937, much of the buying of wool and of fabrics was of a speculative nature, stimulated quite as much by the feeling that industry was in a rising market as by actual needs in sight for the materials.

Net sales of men's wear and dress goods fell sharply in the second quarter and they failed to revive appreciably before the end of the year. The production drop came with the third quarter, and the drop in billings at the start of the fourth quarter. Wool prices, although sagging in the spring and summer, did not make a clear break until September. With September also came definite evidence of mill curtailment, when expected business following August and September openings failed to materialize. Finally in November wool consumption touched a low point 60% below the rate for March which was the peak month of the year.

One large mill reports specifically that its unfilled orders on Dec. 31, 1937, were 50% less than those of similar date in 1936—which checks the relationship of previously given trade estimates. The high point of operation for this large company was June with looms running 130%. This fell to a low of 40% near the end of November and closed the year at 60%.

In the raw wool field 1937 brought a number of influences into the foreign situation which materially affected domestic conditions. For example the Far Eastern situation made it economically expedient for Japan to refrain from her usual purchases of Australian wool; there was also increased production of apparel wools in face of increased use of wool substitutes in many of the consuming countries. The fact of stock accumulation in the wool countries of the Southern Hemisphere is still a problem, but recent estimates place the new clip at only 3% larger than the previous season and stocks in most foreign importing countries are believed to be relatively small.

With the sharp drop since August, total wool consumption in the United States for 1937 figures 12% less than that for 1936, although the very active first half of 1937 set figures that were 20% ahead of 1936. There were large imports of wool in the first half, and although these fell off radically in the second, totals for the year were highest since 1926. Imports of carpet wool were said to surpass all previous years, due probably to an effort to beat the spread of hostilities in the Far East to the point of throttling the supply. Carpet mills were active in the first half of 1937 but suffered with other businesses in the recession of the latter half.

Rising Surplus a Rayon Problem?

WHILE 1938 may be a problem year in many ways for the rayon industry, examination indicates that the favorable factors are about equally balanced with the unfavorable. True enough, the yarn producers moved into the first quarter burdened with 50,000,000 lb. surplus yarn, the largest accumulation they have known in some time. And the price uncertainty which marked the year-end period was not conducive to strong buying. Against these, however, may be lined up two important advantages—(1) Enactment of the rayon rules, by focusing attention on the complete acceptance of rayon throughout the textile industries, has given that fiber the best publicity in its history; and (2) there is hope at last that the rayon weaving industry may purge itself of its chief business ills through enactment of a trade practice code.

As a whole, the yarn industry fared well through 1937; production set a new record, deliveries were below 1936 but above 1935, and prices inclined upward as evident in the behavior of 150-40 viscose, which sold at 60c. for the first three months and at 63c. for the rest of the year.

December, 1937, brought a four-week period of rather nervous price readjustment which carried 150-40 down 9c. to 54c. by mid-January. While the first reaction to the drop was one of hesitancy, buying tone firmed up somewhat in February. Trade leaders are hopeful that the lower levels may open new markets to the fiber. Staple fiber, which began 1937 at 28c. went down later to 25c. and the drop helped materially to widen the markets for this young sister of rayon. Staple fiber consumption in the U. S. during 1937 reached the impressive total of 40,000,000 lb., and prospects are for greater gain this year.

With respect to merchandising, one feature is outstanding: This year, for the first time, rayon goes to the consumer on a basis of complete out-and-out identification. Those producers, and they constitute the majority of the industry, who have fought so long for identification of rayon through store to customer now find their position supported by Federal Trade Commission enactment.

Two educational tasks face the industry this year: (a) Consumers must be made *brand name* conscious just as the new rules now are rapidly making them *rayon* conscious; and (b) Rayon must combat resistance of the wool goods mills, men's wear clothiers, and men consumers to the idea of spun rayon in men's suitings and overcoatings.

As regards new markets, 1937 was notable; it brought rayon into tires, sails, sewing thread, etc., and it strengthened rayon's position in the woven lingerie fabrics. The opening year finds the industry pushing toward further acceptance in shirts, dressing gowns, and miscellaneous men's wear, as well as many other lines. And prospects point confi-

dently to gains along a wide front.

During the last months of 1937 rayon weavers steadily reduced their output until at the opening of 1938, it represented only about 30% of capacity. This timely curtailment, plus the new movement for trade rules to cover overproduction, credit checking, validity of contract, etc., gives the fabric market reason for regarding the current year with some degree of encouragement.

Silk Enters 1938 65% a Hosiery Fiber

IF AS SEEMS probable, the silk market is to follow in 1938 the same general direction it has taken since the July 1934–June 1935 year, then the "Queen of the Fibers" will find itself limited to a narrowly circumscribed field of textile consumption. That is the only logical interpretation to be placed on the December, 1937, consumption figures which showed that 89.4% of imported raw silk went into hosiery, leaving less than 11% to meet the needs of the entire woven goods field.

While this December figure appears startling enough it is reasonably in line with the trend of silk distribution during the last three years. In the 1934/35 year 48% of our raw silk imports went into hosiery as against 52% in woven fabrics; in 1935/36 hosiery's percentage moved upward to 54; in 1936/37 hosiery accounted for 60%; during the first half of the 1937/38 year (July to Dec. 1937) the hosiery ratio rose to 65%.

This would imply that silk's use in woven goods during 1938 is apt to be confined to a limited ultra-high quality market; and, second, that the time is near at hand when silk will be considered largely in terms of hosiery.

For all of its market restrictions, however, silk remained very much in the limelight through 1937, thanks chiefly to the expert merchandising effort put forth by the International Silk Guild. The Guild's Forums and Parade last year were exceptionally effective; indeed, they ranked among the notable textile promotions of the year and they gave retailers much practical aid in selling silk merchandise. On the economic side, 1937 was a year of steadily declining prices; there are possibilities of a somewhat better price position during 1938, thanks to Japan's new stabilization plan for the raw silk fiber.

On the immediate horizon the anti-silk boycott looms large as a problem, though it is unlikely that this emotion-inspired movement will last long enough to affect the year as a whole.

The now pending silk identification rules, on the other hand, are likely to be a major influence all through 1938; and if labelling of silk merchandise becomes compulsory on retailers, the fiber should find its prestige materially enhanced in this field.

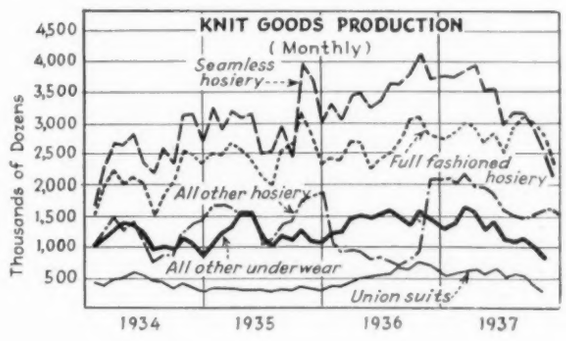
Hosiery Aims to Solidify 1937 Gains

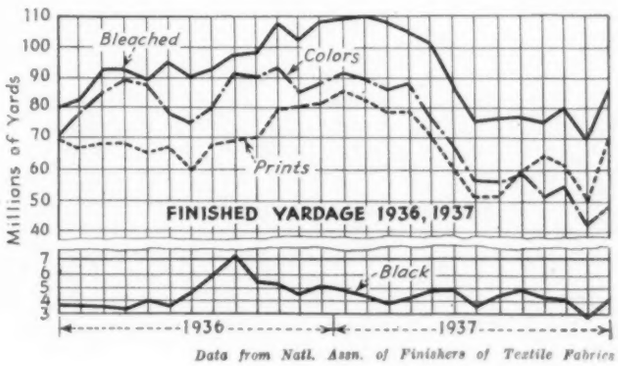
BETTER merchandising through improved trade practices, and continued cooperative action on major problems: It is toward these two aims that the big guns of hosiery effort will be directed during 1938. All of which, however, must not be taken to imply that the industry will fail to give attention to other pressing problems. Indeed, the latter span a wide range, from the proposed Anglo-American tariff reduction on one side to the vexatious boycott agitation on the other—and including costing, pricing, production, etc. Most of all, probably, the industry will concentrate on solidifying the gains that were made during 1937. The year included many notable aspects, among them the new cooperative spirit as manifest at the spring and fall conferences, and the enactment of the compact by which Japan agreed to limit her cotton hosiery exports to the U. S. Curtailment of Japan's hosiery shipments here was widely welcomed; these imports had risen sensationally during recent years, and constituted a serious competitive problem.

Statistically, 1937 made a good showing in hosiery, and if prices were not always as firm as might be desired, at least they suffered no drastic break. During the first 11 months of the year, shipments were 4.7% above 1936. Especially significant was the rise of nearly 33 1/3% in knee length hosiery shipments. The spring and fall industry conferences were so outstandingly successful in bringing out and coordinating trade opinion on current trade issues, that the National Association of Hosiery Manufacturers has decided to hold these gatherings annually; the next conference will be held during the coming fall. The boycott problem is more potential than actual; up to early February it had not appreciably affected silk full-fashioned hosiery sales. However, manufacturers considered it sufficiently serious to justify widespread experimentation with lisle, and an increasing number of firms were making lisle hosiery commercially in February. Improvement of trade practices, especially as regards terms and open orders is the aim this year of a new merchandising division of the National Association; this division was organized in January and already has shaped a vigorous program of activity for 1938.

Underwear Enters Year on Sound Basis

THE underwear industry has reason to be satisfied with both its record for 1937 and its program for 1938. During the drastic sales recession which hit so many textile branches last summer, the knitted underwear division, through prompt curtailment and firm price policy was





Data from Natl. Assn. of Finishers of Textile Fabrics

enabled to end 1937 in almost as good a position as it ended 1936. The Underwear Institute has estimated that the 1937 production would total approximately 45,000,000 doz. against about 46,500,000 doz. in 1936. Shipments were about equal to production in 1937, but inventory showed a slight rise over 1936.

Promulgation of the rayon identification rules by the Federal Trade Commission in October created an intricate labeling problem for the mills. The Underwear Institute acted early on this issue, and secured full cooperation of distributor groups. As a result of continued conferences with wholesalers' and retailers' organizations, much progress has been made toward shaping a plan of action. While various aspects of the labeling difficulty continue to demand attention this year, the essential groundwork has been laid, and prospects point to complete solution.

Merchandising has an important place in the Institute's 1938 calendar, and concerted effort will be soon made to widen the market for the industry's products. With the business barometer pointing toward a slow first half of 1938, underwear manufacturers are now operating on a basis of sharply restricted production, but are looking to gradual improvement through the second half of the year.

Outerwear Has Five Nuts to Crack

FIVE husky problems were inherited by the new year from 1937 in the knitted outerwear industry. While the gravity of these problems is undeniable, trade leaders are hopeful of constructive action on most of them. The issues are: (a) need for a code of fair trade practices on which matter progress is now being made; (b) the current style trend toward staples which is rendering much knitting equipment obsolete; (c) proposed cut in tariff on textile imports from Great Britain which would adversely affect domestic knitters of wool outerwear; (d) increasing competition with woven fabrics, which growth, however, some leaders believe to have reached its peak; and (e) the need for stabilization of contract production, which it is hoped, may be effected by wages-hours legislation during 1938.

There were numerous bright spots in the picture last year, among them increased merchandising effort and a growing sentiment for correction of trade evils. The mills are particularly anxious to halt the custom of supplying retailers with special accessories such as hangers, etc., and the granting of advertising allowances and special discounts. Consistent with trade demand a code of fair trade practices has been drafted and will be acted upon at the annual convention March 22. At the end of 1937 the National Knitted Outerwear Association submitted to the Federal Trade Commission a suggested trade practice code for the recently formed infants' and children's wear division. With due allowance for the uncertain outlook in business generally, prospects for 1938 are considered favorable.

Finishers Depressed Though Fairly Active

AT THE beginning of 1937 the cotton finishers were at the top of the toboggan slide; 1936 had been a banner year; production had hit a new high; most of the well-managed plants were making a profit. Then the descent began. By May more-than-seasonal falling off in activity and increased costs without corresponding price advances had begun to destroy the optimism which had prevailed at the start of the year. In subsequent months activity continued at a lower-than-normal rate; prices in many cases were forced down to profitless levels. In isolated cases labor difficulties added to the woes of the finishers. Imperial and Aspinook voted to liquidate; United States Finishing Co. closed one of its units. It was November before the bottom was reached.

But disheartening as the last half of the year had been, from the viewpoint of production alone, 1937 was somewhat better than an average year. Total finishing activity was approximately 10% under 1936. The biggest loss was in dyed goods which had a 20% decrease. Production of bleached goods and prints declined 6% and 5%, respectively. (See chart, p. 61.)

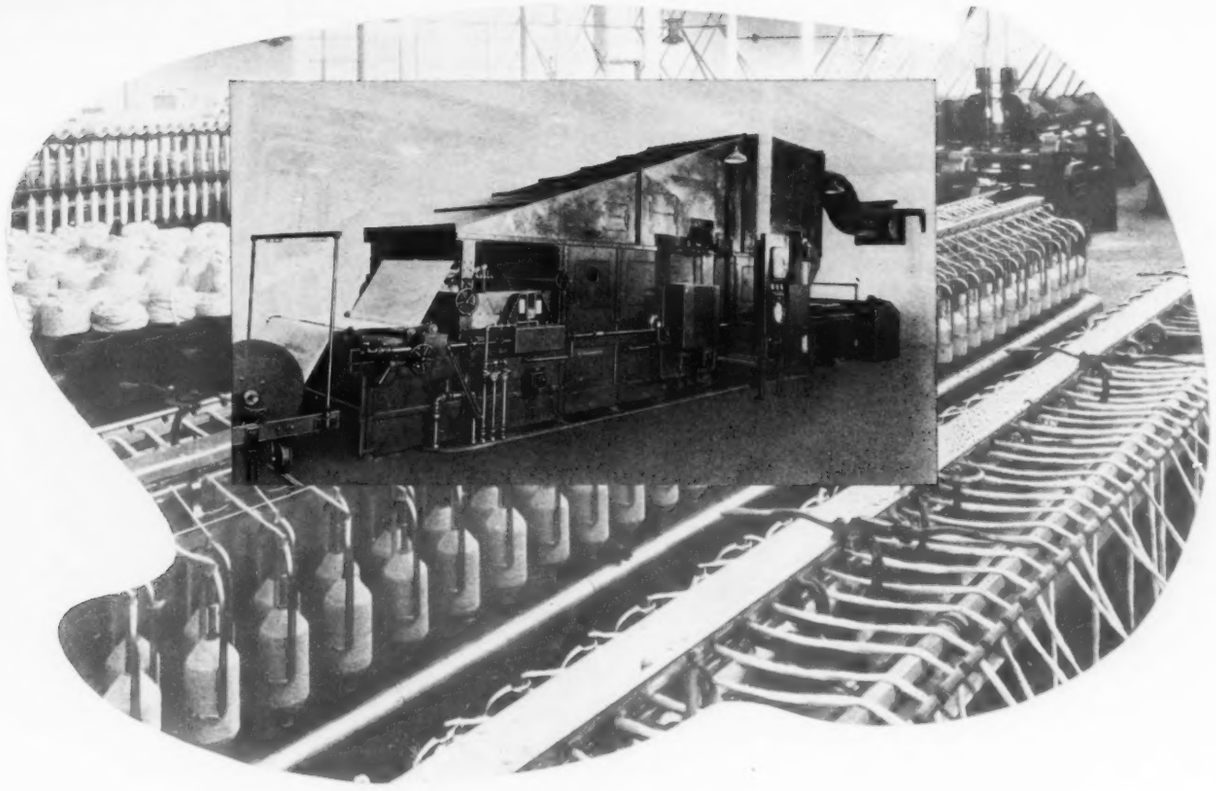
***COTTON FINISHING ACTIVITY:** Total volume processed by cotton finishers in 1937 is estimated by TEXTILE WORLD at 4,219,000,000 yd. as against an estimated volume of 4,780,000,000 yd. in 1936, 4,160,000,000 yd. in 1935, and a known volume of 3,871,632,000 yd. in 1934. TEXTILE WORLD's estimate is 4,400,000,000 yd. in 1933, 4,700,000,000 in 1929 and 4,100,000,000 for 1923–25 average.*

Stocks of finished cotton goods are not excessive and, with the expected general revival of textile activity after the first quarter of 1938, the cotton finishing division can expect about a normal year, as regards production. However, during the last several years the fact has become increasingly evident that so long as they follow their present price policies, the cotton finishers cannot make a reasonable profit except in periods of more-than-normal activity. There is no doubt that finishing charges in general are too low. If the cotton finishing industry is to get on a permanently profitable basis, prices must be raised to and kept at a considerably higher level than they are now.

Bad as conditions have been in the cotton finishing industry for the last several years (1936 excepted), they are incomparably better than those in the rayon and silk division. It is so long since the rayon and silk finishers have made a profit, that they have almost forgotten the meaning of the word. Bankruptcies and plant liquidations continue at a discouraging rate. United Piece Dye Works has closed all but one plant. Textile Dyeing & Printing Co. has shut down indefinitely. No official figures are available in the silk and rayon division, but TEXTILE WORLD estimates total production of finished goods at 340,000,000 yd. in 1937, as compared with 418,000,000 yd. in 1936, 440,000,000 yd. in 1935, 406,000,000 yd. in 1934, and 474,000,000 yd. in 1933.

The one favorable sign is that the rayon and silk finishers, as well as the city officials of Paterson, N. J., are making an effort to save their industry from complete decay. Early in June General Hugh S. Johnson presented a report of a survey of the printing industry, which he had made at the instigation of the Textile Printers' Guild. The following month a hearing was held under the auspices of the Federal Trade Commission to consider a set of trade-practice rules advocated by the Paterson Industrial Commission and designed to eliminate unfair trade practices in the dyeing and printing industry.

Strong objection to the cost of the plan recommended by General Johnson—reported to be $240,000 annually for three years—developed, and it was decided to forego the privilege of having the General become "czar" of the industry. Instead, the printers formed a new organization, the Rayon & Silk Printing Association, which includes both large and small companies, to put into effect certain of the measures recommended in the Johnson report. Subsequently a code of procedure was adopted and association members conferred with those of Textile Converters Association.



Cotton Manufacture

Advances include acceptance of long-draft roving and introduction of high-speed slasher

By HORACE L. PRATT
West Point Mfg. Co.,
Shawmut Mill Division, Shawmut, Ala.

TWO OUTSTANDING advances during 1937 in cotton mill processes were the widespread adoption of long-draft in the card room and the introduction of the high-speed slasher (pictured above). These will be discussed more at length in subsequent paragraphs. Another sign of progress is the step that many mills are taking to train their own technicians. Even if this does not result in the introduction of any new methods, the training of an increasing number of men should bring about a better understanding and more efficient use of existing machines.

A typical installation of modern opening and picking equipment might be something like this: lattice feed apron, sometimes with blending feeders; bale breaker; some form of cleaner, such as the centrifugal air machine or an upstroke cleaner; a vertical opener; distributor cleaner; trunk line to picker room; some form of automatic distributor, such as the rake distributor; and one-process picking. Possibly, in a short time we shall hear more about air filters in opening and picking, but as yet these are more or less in the experimental stage.

The terms "controlled-draft," "interdraft," "superdraft" and "multiple-draft" are now common in card-room circles. A few mills, on extremely coarse work, have eliminated all but one process of drawing, cut out the slubbers, and removed the creels from the speeders; and are making very satisfactory 1-hank roving from drawing sliver. Mills on lighter work have eliminated one process of drawing, and, perhaps, the jack frame and an intermediate, by the adoption of one of the long-draft frames.

High drafts in the card room were made possible only after some means of controlling the fibers, in the process of being drafted, was developed. Mills that had tried drafting the stock to a greater degree with the conventional type of rolls discovered that a ragged selvage and uneven work resulted. The plan worked out to overcome this difficulty includes a primary drafting stage of, say, two pairs of rolls, then a folding zone in which the fibers are given about a half turn, this being accomplished by a scroll, a curved plate, or folding rolls; next the stock enters the final drafting rolls, thus accomplishing the work of two machines in one. Drafts up to 25 or more are now practical, and in experimental work drafts exceeding 100 have been run. It has been predicted that ultimately no more than one drawing operation will be necessary to convert drawing sliver into yarn. In one of the textile meetings, it was brought out that in a print-cloth mill the doublings have been reduced from 4,608 to 36.

Long-draft spinning continues to

gain in favor. One feature that should be stressed in connection with the installation of long-draft spinning spindles is that most of the new frames that are being put in are built to produce larger yarn packages. On frames making finer yarns the packages have been increased from 1.5 to 4.6 oz., and, on frames designed to make heavy yarns the packages have been increased from 4.5 to about 12 oz., resulting in considerable savings in labor costs and in greater lengths of yarn without knots.

No radical changes have been made in twisting, warping, or winding. However, due to the current tendency toward longer twisting (and spinning) frames, one concern has redesigned its builder and traverse motion to secure greater strength, rigidity, and durability. A new creel to permit twisting from cheeses works well on from two to four plies. A warper that can quickly be changed from a beam warper to a ball warper is now being offered.

Slashing and Weaving

The outstanding improvement in slashing has been the development of a new high-speed slashing system. (The October, 1937, issue of Textile World carried a comprehensive article describing this new system.) Important features of this system include yarn speeds up to 100 yd. per min., increased drying capacity while conserving steam, automatic tension control, an enlarged size vat with a ribbed immersion roll that facilitates penetration, a magazine creel with friction-release arrangement, a drive employing a well-known variable-speed transmission, automatic, built-in temperature controls. Mill men are already reporting increased weave room production following the installation of this new system.

Two instrument manufacturers have brought out equipment for controlling the moisture content of the yarn as it leaves the slasher.

Marked improvements in the preparatory departments of the mill, along with refinements in bearings, loom strappings, reeds, the shuttle box, the protector motion, and in other important details, are making for greater loom efficiency. In this connection, it should be noted that correct lubrication must go hand-in-hand with the other improvements if the newer high-speed looms are to operate successfully. Lubrication engineers are giving special attention to the troublesome crankshaft and the rocker shaft.

A single-shuttle loom has come out with a new design of cam harness motion. This cam motion, in combination with an improved narrow-gage spring top, operates the harnesses as smoothly as a dobby. Examples of the present trend in loom speeds are looms making terry towels at 162 picks per minute; a 25-harness loom on cotton upholstery making 142 picks per minute; and a convertible dobby loom capable of being operated on 4x1 or 4x4 work, running with 20 harnesses at 121 picks per minute on cotton bedspreads. A number of installations have been made of the Energy drive, which was developed in late 1936.

Much remains to be done, however, before we can say that our weave rooms have been modernized. A loom census, by one of the outstanding makers of weaving equipment, shows that fewer than 20% of this company's looms installed in this country are less than 10 years old and 25% are over 25 years old.

Of special interest in new cloth-room equipment is a four-knife shear which will accommodate all types of woven fabrics, from the lightest silks and rayons to heavy duck. Installation of electric hoists in the cloth room facilitates the handling of heavy rolls and bales of cloth.

Other items of general interest that might be mentioned include a compressed-air bobbin stripper, and a cotton-lap meter which permits analyzing of cotton laps yard by yard, as well as indicating the correct weight of each yard inspected. Synthetic roll covers are still being tried out, but as yet their acceptance has not been general. In the office we find the lighting improved, modern bookkeeping and pay-roll systems being adopted, and air-conditioning systems being installed.

Laboratory

In order to meet the exacting requirements of this modern age, science has been called in, to aid, by control and research, in the production of yarns and cloth that will meet present-day needs. Last summer a group of southern mills opened a modern, thoroughly equipped, air-conditioned laboratory for control testing, specification compliance testing, and research. Other mills and groups of mills have laboratories, or are finding it necessary to have their testing done by outside laboratories.

Mills are doing more than ever before to train their men, both technically and practically. This training is not undertaken to supplant the textile schools, but is for that large group of men and boys who would be unable to attend college. Some of the high schools have added courses in textiles to their regular curriculum, with the students getting their laboratory work right in the mills under normal working conditions. One group of mills has a textile school building equipped with at least one machine of each kind needed to operate a normal mill. Another group has, besides the usual evening textile classes, advanced classes, taught by a competent instructor with a degree. The students receive instruction in cotton mill processes and calculations, designing, fabric analysis, and dyeing.

Rayon Staple

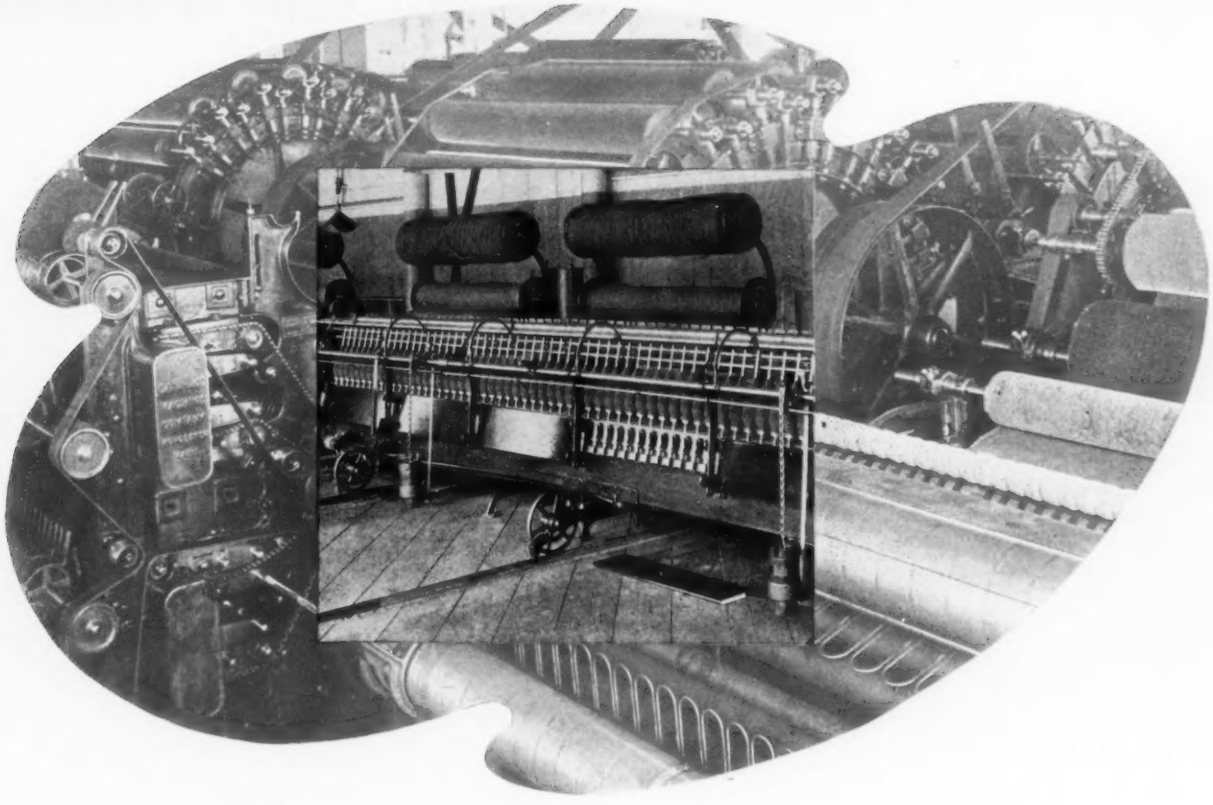
Production of yarns and fabrics of rayon staple, or of rayon staple in combination with cotton, has reached such proportions that a summary of developments along this line is not out of place in a "cotton" review. Rayon staple with bright, semi-dull, or dull finish, manufactured by either the viscose or the acetate process may be used, and is available in different deniers, and may be cut into any desired lengths. It seems, however, that the size most commonly used is 1½-den., 1½-in. staple. Other popular sizes are 5½ and 8 denier, both 1½-in. staple, and are used to produce yarns having a woolen effect. Rayon staple is received by the mill in bales. As no cleaning is necessary, the rayon staple is run through the opening and picking machinery only for the purposes of opening and fluffing the stock, and putting it in the form of a lap for use at the card. Settings of the various machines are made solely to produce a good, even product, with a minimum of waste.

Items of main importance in running rayon staple are: control of humidity and temperature; correctness of roll settings, speeds, and twist; smoothness of rods, trumpets, and eyes; uniformity of tension; and prevention of oil stains.

Weaving of rayon staple is facilitated by use of reeds and harness especially adapted to this fiber; and the flat-bobbin shuttle is fast coming into favor in the weaving of this product.

In the mechanical-goods field, a heat-resistant tire cord has been developed by lowering the elongation to a minimum. This lower elongation enables the cord, after it is made into the tire, to resist stretching, thereby reducing the heat of internal friction. The resistance to stretch, further, tends to prevent the breaking down of the sidewalls of the tire. A chemical treatment is sometimes given to the cord.

In connection with mechanical fabrics, it should be mentioned, incidentally, that filter fabrics made from fibrous glass yarn are now being produced commercially and that manufacturers of glass fibers are planning to offer the electrical industry a complete range of insulating materials, including yarns, tapes, and braids.



Woolen and Worsted

Technical developments headed by improvements in mule spinning and increased use of rayon staple

By JOHN C. LOWE
Lowell Textile Institute

OF THE various developments of the year in the woolen and worsted industries, the great increase in use of rayon staple is undoubtedly the most far-reaching in its effects. At present, the rayon staple is mostly of the viscose type, but use of acetate staple is likely to increase. Thus far wool and rayon mixtures have been particularly important in fabrics for cheaper suits, retailing from $15 to $22.50; now they are entering the higher-priced suitings. Another development which should be noted at the outset is that the steady gain of woolen ring frames has been arrested by improvements made in large-package mules (pictured above). Today the demand is equal for each type of equipment.

Results of tests indicate that Frosted Process wools may replace ordinary scoured wools for much of the woolen manufacture. In 100% Frosted wool yarn, grease left in wool after frosting obviates oiling the wool for carding and spinning. Renewed interest has been created by improvements in the suint-cleaning method of wool scouring. Re-use of suint has been made commercially possible by development of suitable high-speed centrifugals and methods of using them. Advantages claimed for the suint process are that the wool grease recovered is of a superior quality, and cost of scouring is reduced one-half; better scouring leaves the wool in excellent condition.

Steady progress has been made in the design of woolen yarn machinery. Under a severe test an improved shredding picker gave a production of 2,200 lb. per hr. with a cylinder speed of 800 r.p.m. This picker could safely be run at 1,000 r.p.m. In an improved pneumatic system of wool conveying and blending a rotary blender is used in the mixing bins to spread the wool.

Mill experiments with better-grade stocks indicate good prospects for use of metallic wire on both woolen and worsted cards. Equipment for combining two ends from tape condensers before they are condensed is in process of manufacture. With it, heavier roping may be produced, using tape condensers. Another new attachment for tape-condenser woolen cards is a vibrating knife which removes straggling fibers caused by division of the web by the dividing rolls; more even and smoother roping results.

On one type of mule staggered spindles, which allow an increased gage without any increase in the spacing of ends, are used. This results in from 30% to 50% increase in the size of the full package. Special heat-treated spindles and a patented self-aligning collar board permit speeds of 6,000 r.p.m. without vibration.

Another large-package mule, carry-

ing a 13½-in. bobbin, has an improved spindle assembly, with an individual ball-bearing step for each spindle. Combined with an extra-heavy bolster, this step supports the ball-bearing housing, which floats when the spindle is rotating. Lubrication every two years is said to be sufficient for the ball bearings. Accurate construction and sectional band drive equipped with tension regulator reduce variations of the operating spindle-speed to as small as 0.1%. Even more recently, a 15-in.-package mule has been introduced.

Latest woolen ring frames have 6½-in. gage, 5-in. rings, and produce as high as 2 lb. on a package. Economies resulting from the large packages include less doffing, 85% reduction in knots in the yarn, and direct dressing of warp from the bobbins.

Worsted-Type Spun Rayons

For mills specializing in worsted-type spun-rayon yarns several new machines are available. An improved rotary cutter with a double-bladed knife can make 500 cuts per min., using as many as six ends, and cutting rayon waste to any desired length of staple up to 8 in. One prominent firm has designed an opener to prepare rayon staple for either woolen or worsted carding. It is adapted to handle all lengths of staple and can produce 1,000 lb. per hr. This firm also makes, for the worsted system, a rayon-staple card which has a special feed end and breast, a single cylinder 60 in. in diameter, and is clothed throughout with hardened-point metallic wire.

The year 1937 was notable for the large number of inventions which have for their object the breaking and/or cutting of filament rayon in a sliver, thus reducing it to fibrous form and at the same time preserving the sliver formation. It is hoped that in this way both carding and combing will be eliminated. Other inventions seek to impart crimp to staple fiber.

A new pressure-compensating device for Noble comb apron-motions is available; with this device uneven pressures are said to be impossible. Intersecting gill boxes are extending their field of usefulness. Their use for coarse wools, carpet wools, and mohair permits a larger volume of material to be handled by the fallers. Since the wool cannot get out of pin control, thorough gilling results. When properly used, in the English system of worsted drawing, further reductions in the number of operations will be obtainable.

Experiments indicate the possibility of developing a high-draft intersecting gill box, producing a "cone" twisted roving, followed by a high-draft spinning frame. Another interesting high-draft machine for yarns spun on the worsted system uses freely-mounted pinned rolls, rotated by the passage of stock. Both drawing and spinning frames can be so equipped, and it is said that cotton, wool, rayon staple. and their blends can be handled satisfactorily.

A new variable drive for spinning frames has fully automatic control which regulates speed according to winding-surface diameters, with the slowest speed on the minimum diameter. Worthy of note are an improved mechanical doffer, with which cap frames can be doffed in 1½ min., and an improved mechanical-doffer flyer frame.

Recent research has called attention to power savings made possible on spinning and twisting frames by use of ball or roller bearings for cylinders, ball bearings for spindles, keeping the frames well leveled, and using thinner tapes for spindle drives. Ball bearings for cap spinning tubes are now available. The tubes are supported by a washer or cap which rests on ball bearings carried in a housing provided with the usual lubricated felt washer and supplied with lubricant by ducts from an annular groove. A cap anti-twisting device provides a spring which is attached to the top of a slotted spindle. The spring engages a groove or slot in the cap. An improved twisting frame gives spindle speeds ranging from 17,500 to 20,000 r.p.m.; a jacketed bolster is provided for each spindle, through which air, water, or oil is circulated as a cooling medium.

French Drawing

Latest sets of French drawings have four or five operations of intersecting gill boxes. Flyer and cap frames designed to handle French-drawn rovings are available. Ring frames have been improved for spinning fine yarns on which higher spindle speeds are possible. Pneumatic "anti-marrying" devices have been perfected and adapted to both mules and ring frames. Anti-snarling devices have been attached to ring frames. Possibilities of high-draft drawing and spinning are being investigated.

Use of differential-drive spinning mules has increased. Today over two million spindles—in both cotton and worsted branches of the industry—are equipped with it.

Two new synthetic rubber compounds which have possibilities as roll covering have been announced.

An improved automatic and traveling unit cone and cheese winder not only feeds supply packages from a magazine, but also prevents slubs from passing and automatically ties broken ends. Another winder is designed to wind three packages on the spindle.

A decided novelty of economic value is a so-called twisting reel, which not only twists yarn but reels it into skeins at the same time.

A recent patent makes possible spinning of yarn from blended slivers; for instance, long wool or mohair and short vegetable fibers, such as cotton. The short staple is introduced at the second carrier nip on a worsted spinning frame.

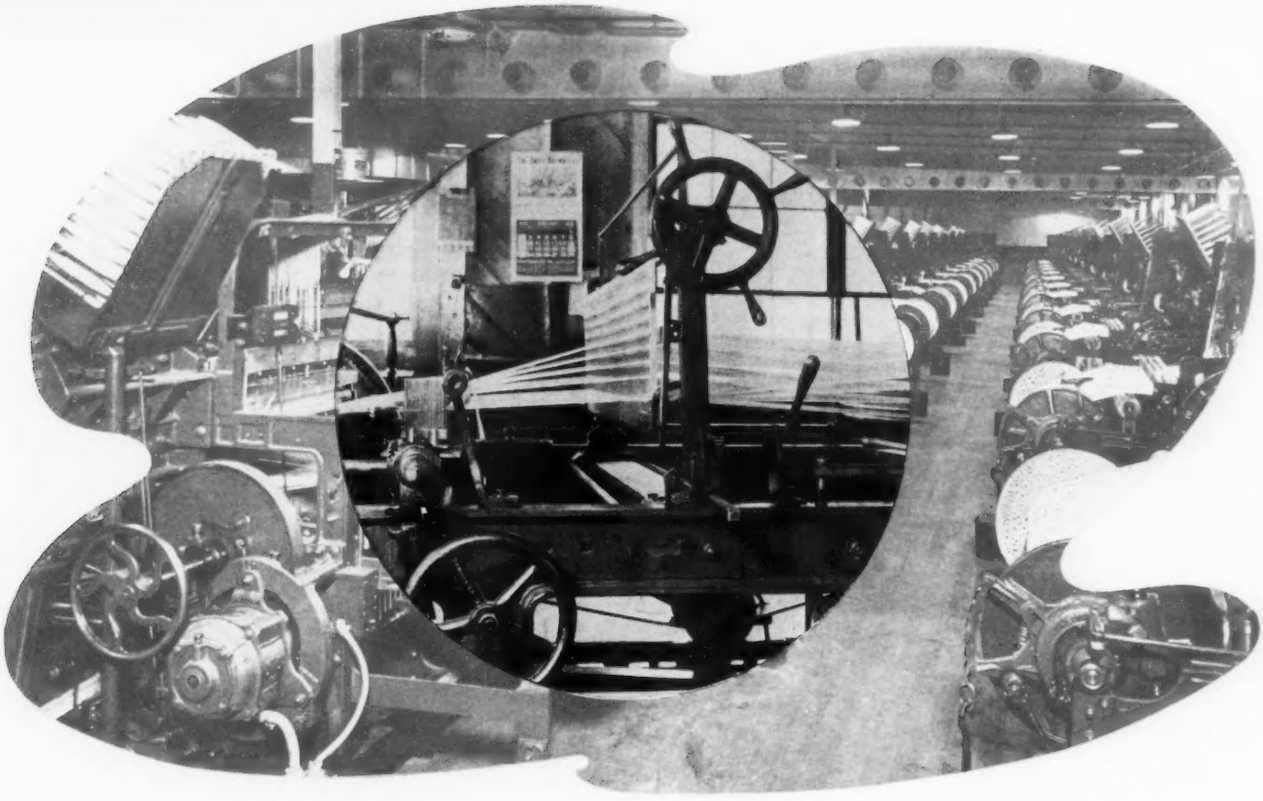
Progress in Weaving

Many interesting developments with regard to warp preparation and weaving took place during 1937. Thus, a combination ball and beam warper was placed on the market early in the year. Yarn speeds up to 400 yd. per minute have been obtained in actual practice.

Circular looms received much attention by one firm. Shuttleless looms are also being made. Another new loom has a stationary lay and stationary shuttle boxes. The filling is beaten up by the blades of a comb which moves constantly in an ovoid path. A new circular box motion operates the change positively by gearing, thus requiring fewer parts. A semi-automatic box loom has been designed for multi-color weaving, especially where some shuttles are used less frequently than others. Unusual patterns may be produced by use of an attachment which varies the tension in selected groups of warp yarns.

A new reed spring, which serves as a shock absorber on the beat-up, has been developed. Four or more are used per loom, according to the reed length. The device is suitable for yarns having a low elastic limit. A tubular-aluminum-end heddle frame which will keep its shape under severe conditions is available; the frame can be equipped with a new one-piece locking system. A new type of harness strapping made from a high-grade cotton and rubber composition was recently placed on the market. Another improvement in loom-harnesses is designed to prevent transmission of lifting stresses of the harness motion to the frame which carries the heddles

An attachment said to decrease filling breaks by at least 75% is a two-piece shuttle control, so designed that the shuttle box exerts no tension or pressure on the shuttle as the picker stick throws the shuttle from the box. At the same time the device postpones the tension on the shuttle box until the shuttle is almost completely in the box, just in time to prevent rebounding. Elimination of loose and tight picks is assured by the use of a new worsted tension shuttle. With it, positive tension is obtained on the first pick in bobbin-changing looms.



Rayon and Silk

Developments in throwing, warp preparation, and weaving include ingenious leasing device

By H. I. JACKSON and H. E. WENRICH

In this article Mr. Jackson reviews the technical progress of the year in throwing rayon and silk. Mr. Wenrich discusses the advances in warp preparation and weaving, including leasing device shown above.

PROBABLY the most notable progress in throwing during 1937 was the attainment by many plants of a balanced large-package set-up. This was achieved in most plants by increasing diameters, but in others by extending traverses, or a combination of both. Yarn producers assisted the rayon throwsters by giving them skein sizes that fit in with their package units. Wise silk throwsters governed their package sizes by the silk skein.

An acute twister-spindle shortage last spring in many silk plants was eased in a number of cases by machinery purchases and by speeding up spindles. Spindle speeds ranging up to 18,000 r.p.m. for single-end 13/15-den. silk on up-twisters and as much as 10,000 r.p.m. on ring twisters were achieved by one machinery manufacturer, who also improved idlers so that they would run six months without re-oiling. This same manufacturer stated that experimental spindles had been running two years without oil additions, but he recommends yearly oiling.

As to other improvements, it was encouraging to note increased use of ball and oilless bearings on vertical shaftings and inclosed units, such as gear boxes, on throwing machines offered during the last year. Felt wicking to retain oil in throwing machinery is a recent application of an old device. Spindleless attachments received quite an impetus, due to improvements and promotion by an important machinery builder.

Hardened wire as a substitute for porcelain was noticeable both on the newer machines and as adapted to older models. One manufacturer now offers it for traverse guides, and another in a faller-finger assembly. Several mill supply houses are stocking and pushing hardened-wire items. They appeal greatly, due to their being non-chipping, light, easy to mount, and more accurate. Slightly offsetting this trend is the development of super-hard porcelains.

An improved conditioner for setting twist in silk and rayon is made of stainless steel incased in a welded steel frame and insulated with a Portland cement and asbestos board. The interior is non-sweating; additional insulation is obtained by a liner of asbestos wool and by molded rubber seals. The conditioner has a single set of quickly adjustable instruments acting as controls and recorders.

Metal traverse rails, in place of wood, were to be expected, although, even in spite of their obvious superiority, they are still in the "being introduced" stage. This type of rail is incomparably superior when used with the new guide holders which have adjustments limited only by the length of the rail itself.

A recent presentation is the bob-

bin cover for use in up-twisting of silk. This cover is intended both to keep down ballooning and to keep yarn clean and free from fly. The same manufacturer who introduced this item offered a stop motion to operate between the feed rolls and the rings of silk doubler-twisters. This should banish roller laps. The unit was coupled with a non-slipping corrugated feed roll, which has been particularly recommended for high twists, such as those employed when ring spinning to direct-knitting packages. This is an old type of roll, but the application is new.

An oilless spinning ring employing a novel easy-threading traveler was introduced about the middle of 1937.

Excessive Strain Eliminated

The offset bottom deck on twister machines has long presented a problem of excessive strain on the end idlers. This problem, it appears, was solved with relative success last year through the introduction of a self-aligning ball-bearing idler that can withstand much pressure and requires only infrequent lubrication.

Although the trend toward elimination of the redrawing operation continues, last year saw an improved unrolling stop motion which prevents the revolving supply bobbin from overriding when an end breaks or becomes unduly slack. This could be run in conjunction with a full-bobbin stop motion, or a sizing device, to eliminate waste from over-full bobbins and also to make bobbins of uniform size.

Larger packages not only brought a continuation of larger spindles to accommodate them in twisting, but also a new swing-gate which works much as does the front-wheel mounting of an automobile.

An improved flyer which embodies light running and a stop pin to keep the thread from snarling when a twisting spindle is stopped, was developed and offered recently. The stopping device is inclosed within the flyer, adding practically no weight or air resistance.

A new winder offered several months ago differs from its competitors principally because of a traverse motion which is driven from a heart-shaped cam and is constantly kept under tension. This assists smooth operation and production of accurately wound, ridgeless bobbins. The winder also has a flywheel which permits slow start-up and gradual stopping.

There has been great demand for the new self-stacking bobbin trays which withstand much abuse and are plated for protection against rusting.

Principal improvements in cone winders for silk were in their lubrication systems and in making small parts more serviceable. Wider tensions were employed for more wear; idler pulleys were equipped with oil-retaining bushings and grease fittings requiring attention only yearly. Sizing mechanisms were made more sensitive and to operate without pressure against the package being wound.

All three so-called one-process silk twisters, for putting hard- or normal-twisted silk on either cones or filling bobbins, have received many modifications since they were introduced a year or so ago. Principal developments have been in the direction of twisting and winding directly to cones rather than to any other type of package. Also, the aim of all is to be able to build simultaneously packages varying in fullness. The trend is away from over-end delivery, due to tensioning problems.

Silk soaking baths have had to be modified to overcome problems introduced by higher twist and direct knitting. In soaking rayon, the trend is toward synthetic sizes, and to a small extent toward mineral, rather than vegetable, oils. In natural products, more gum and less gelatin is being used where heavy creping is desired. Prepared sizes for predetermined pebble characteristics are coming into more widespread use. A half-size soaking unit was introduced during the year.

The present year should bring to light the new doubler-twister on which machinery companies are known to be working. On the same type machine, a traverse with a different motion is also to be expected. Greater simplicity, higher speeds, lubrication improvements, larger packages, and more spindleless winding all appear as the natural developments for 1938.

(Mr. Jackson's contribution is concluded at this point. Mr. Wenrich's discussion follows.)

Warp Preparation and Weaving

From the viewpoint of the silk and rayon weaver, the most important single development in 1937 was the remarkable increase in use of cut staple rayon. Coupled with this increased use, the fact that spun rayon yarns can be processed equally well on either the cotton or silk system has presented many opportunities for the design and introduction of new machinery.

Several builders have placed on the market seven-cylinder sizers which can be changed from the cotton to the silk system in a few hours' time. These machines offer numerous advantages to cloth manufacturers, who can keep their outlay for necessary machinery at a minimum. Other improvements along this line include stretch-control devices, between the creel and size box, on several types of sizing machines, as well as improved drying methods.

A new leasing device available to cotton mills running rayon has many advantages. Requiring but a few minutes time to place a lease in a warp at the back of a slasher, an operation which formerly took half an hour, this ingenious device, which was described in detail in the May issue of TEXTILE WORLD, facilitates the handling of warps at greater speeds.

For use with heavier rayons and fine-count silk warps, as well as with hard-twist warps such as georgette and sand crepe, reed makers have brought out several new money-saving improvements. For example, chromium-plated reeds, rust-proof and nearly wear-proof, have proved economical.

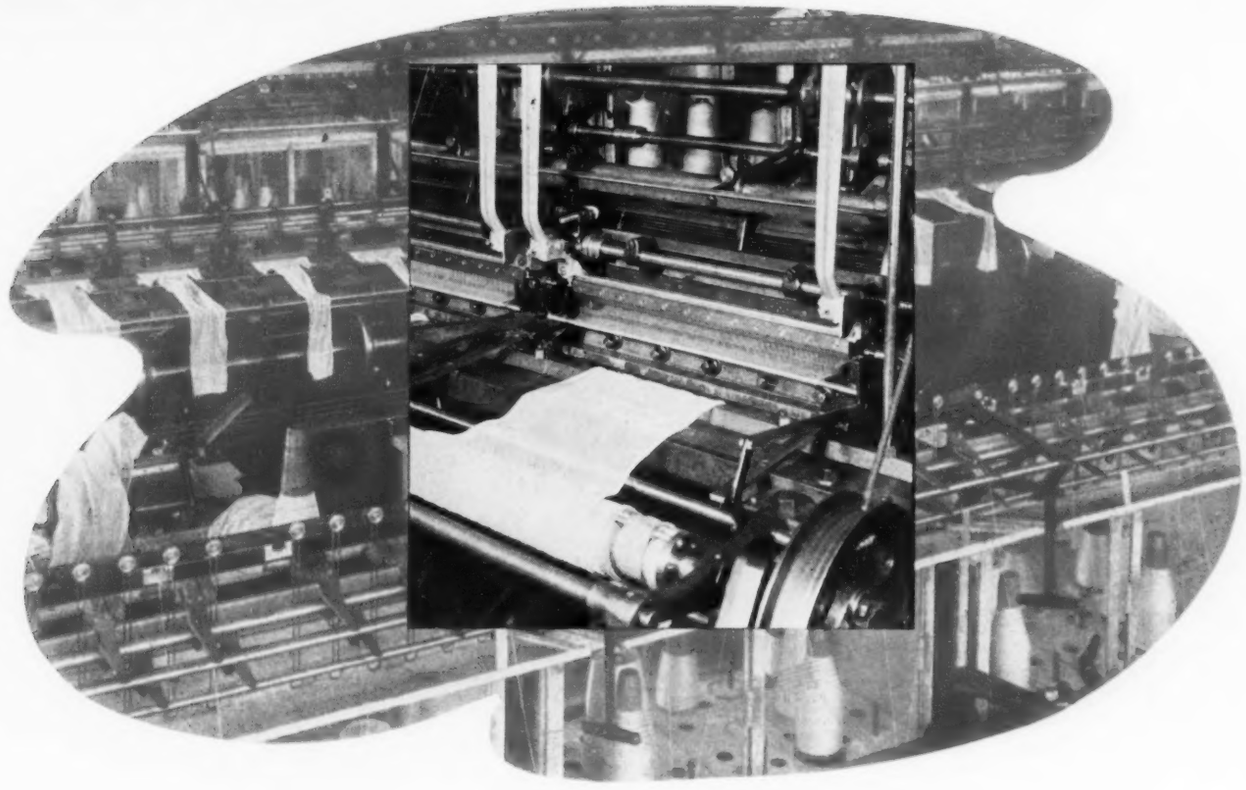
In keeping with the modern trend, mill after mill has adopted the large, flat quills for silk and rayon weaving, and other mills are now installing them. Further to facilitate production increases, loom manufacturers have brought out shuttle-changing looms and have adapted their non-automatic looms to the handling of flat shuttles, making them, as far as actual mill practice is concerned, semi-automatic in operation.

Shuttle-Changing Device

A new automatic shuttle-changing device has been introduced very recently. This can be placed on 2x1 looms, after certain changes have been made, at relatively low cost.

Shuttle manufacturers, to minimize difficulties, such as streaks and damaged woven cloth, due to improper filling-yarn tension, have brought out equipment to check and test the tension of yarn in shuttles. Shuttles have also been improved: one flat shuttle manufacturer dropped the line from point of shuttle to quill receptacle, at the same time shortening the shuttle without shortening the quill; another improved the ear clips; still others changed their flat-quill line in other respects. A number of different types of flat shuttles and quills have been introduced, so that they now are available to fit the needs of practically any manufacturer and any type of loom.

An improved rayon and silk twist-setter, in addition to the one described by Mr. Jackson in the first part of this article, is also now available. This equipment can be operated by the low-pressure steam method, as well as by electricity, saving coal in the summer when mill heat is not needed. Primarily intended for throwsters, this conditioner can be changed over for conditioning cops for weaving and cones for knitters.



Knitting Progress

Completely automatic full-fashioned hosiery machines nearer; other machines show improvements

By I. C. MOORE

IN REVIEWING the year's progress in the knitting industry, one is impressed immediately with the fact that the machine builders are wide awake. This is evidenced by the large number of new attachments and other mechanisms which have been developed for the purpose of increasing the production and the design capacity of various types of equipment. Outerwear, underwear, and circular hosiery machines have all shown notable improvement. The trend toward making full-fashioned hosiery machines more completely automatic has continued, the most recent advance in this direction being the commercial production of an automatic mechanically operable welt device (shown above) permitting setting-up of initial courses and turning of welts to be carried out without stopping of the knitting machines and without requiring any skill or laborious effort on the part of the operator. The welt device can be applied to existing machines of 42-gage, or finer; and time studies made on machines on which it has been installed indicate a 20 to 25% increase in production through its use.

An important improvement which has been made on a well-known make of high-speed full-fashioned machine is the incorporation of an automatic draw-off motion. With the old weight-and-pulley method, in which the draw-off-tension changes were performed manually, sometimes a whole set would be spoiled because the knitter failed to set this mechanism properly. The automatic draw-off motion tends to eliminate the human element of this function. Other improvements on this machine include automatic operation of the camshaft shock absorber; automatic loose-course motion designed to permit use of three different loop lengths automatically; wide-chain motion combined with automatic course counter, making it possible to reduce the chain length; and special footer course counter integral with the chain motion, which facilitates changes in foot sizes.

In a German-made single-unit machine the split needle bar is divided into sections to permit altering the width of the instep, and flexible carriers have been redesigned without the top tube, increasing the range of yarn counts which can be handled and facilitating the removal of knots. A single-head machine has been standardized to produce single-unit stockings by holding the instep stitches in a pivoted transfer bar while the heel tabs are knitted, the tabs then being topped on the needles. A frictionless draw motion in a single-unit machine provides a full shock absorber and constant lead control for all selvage-to-selvage carriers and eliminates the impact of the carriers on the end stop; a slow motion friction rod aids in the operation of the splicing carriers.

Foremost among new sewing machines is a high-speed cup-feed seamer for closing the back seams on full-fashioned hosiery; owing to the more efficient and positive feed of this new mechanism, cutting along the seams has been considerably re-

duced; speeds are 40% higher than with previous models.

Circular Hosiery Machinery

While the knitting experts were saying that sinker-reverse-plating could not be done as accurately as the needle-deflective method, a machinery manufacturer came out with a 25-step circular hosiery machine with the plating controlled with a single pattern drum. This machine is capable of knitting a wide range of patterns, including large argyles for half hose, anklets, and golf hose; the machine is built for 24, 36, and 48 gages.

An improved machine for producing the English rib sock is fully automatic, making the usual 1x1 rib top and the 6x3 English derby rib leg and foot, or almost any combination of rib in plain or fancy colors. An attachment for the ordinary reverse-plating machine to knit in a vertical stripe or clocking of contrasting colors—known as mock wrap—made its appearance during the year; the stripe or design is knit in at the place desired by reverse-plating, then withdrawn and allowed to float to the next design instead of being knit with the body yarn; later the float yarn is clipped off in the usual way. In order to avoid a fuzzy appearance from the outside, an electric clipper, similar to the ordinary hair clipper, was introduced to clip the threads very close. Other improvements in circular knitting machines include the addition of a horizontal yarn striper to the automatic panel-wrap machine and incorporation of a color-in-color-and-beside-color attachment to a 36-wrap machine.

Early last year there was brought out a two-feed hosiery ribber with revolving cylinder and dial, which makes possible a higher knitting speed, and easier control of plating; this machine is fitted with two five-color knot tiers, provision was also made for twenty steps of reverse plating, and laying in of elastic yarn on every other course. Another interesting ribber is a machine built especially for producing the selvage or finished welt by racking the needles up to line as welt is completed.

A four-feed ribber is arranged to throw three of the feeds out of action while knitting the welt and loose course, thereby simplifying the knitting of this portion by a single feed. Still another four-feed ribber is designed for special half and whole loose courses and permits the same transferring as a two-feed machine.

Underwear Machinery

Of particular interest among the new machines designed primarily for the underwear industry is a multiple-feed rib-body machine; on this machine as many as sixteen feeds can be used on a 14-in. cylinder; the yarn carriers swing out from the needles, which is a great aid to the operator when threading the machine. A jersey-stitch machine, with wheels and tuck bars on all feeds, is equipped with new sections which can be changed from lay-in to regular work or *vice versa* in one-fourth the time formerly required. On a new revolving-cylinder sinker-top girdle machine, provision has been made for throwing the elastic yarn in or out of action when changing automatically from design to plain work and *vice versa*. On another machine of this type a small individual furnishing well for running elastic yarn has been applied to the back of the pattern-wheel. A double-butt tuck-rib body machine has been equipped with a new cam rim which permits knitting of vertical float stripes. Another interesting underwear machine is a tricot knitter of German make, capable of runing 75-denier rayon at 310 racks per minute.

To insure uniform tension on elastic yarns, a yarn-feeding mechanism which can be adjusted for any predetermined amount of tension and which can be quickly attached as needed has been brought out. A rib-body machine with a gear-driven dial will be welcomed by knitters, since there are no dogs between the cylinder and dial to pinch or chafe the fabric on its way to the take-up rolls. For attaching elastic to undergarments, an improved sewing machine has an adjustable guide designed to stretch and guide the elastic from a continuous strip to the feed plate.

Outerwear Machinery

Among the unusually large number of noteworthy machinery developments which have occurred in the outerwear branch of the industry there is included a double-lock, links-and-links machine which produces raised effects floated on the face of the fabric; this machine knits the purl stitch irrespective of the direction of the carriage and produces the moss stitch, lace stitch, embossed effect, jacquard designs, and tucked effects. Another links-and-links machine was introduced with nine-fold selective automotive rack. Other developments in flat knitting machines include a multi-racking jacquard type, which knits three fabrics of different designs side by side simultaneously; and a high-speed, twin-bed rib-type machine giving automatic racking of the rear needle bed up to six needles by one needle at once or two needles at once, and having facilities for quick change of gage.

A spring-needle rib-body machine has been equipped with new pattern wheels for producing fancy-welt, raised-stitch effects on bathing suits; when any obstacle is encountered by the wheel, such as a jammed jack, the lug is forced out of the slot and the wheel swings free of the jack. A striper applied to a leaded spring-needle machine makes it possible to knit in the vertical stripe where it is wanted, without reverse-plating or the yarn-wasting method of floating threads; the device consists of three separate assemblies: a cylinder cam attached to the cylinder of the machine; a chain bracket attached to the ring underneath the cylinder to govern the length of stripe; and a striper assembly comprising two fingers for changing the colored yarns and a shear for cutting off and holding the yarn that has been taken out of action.

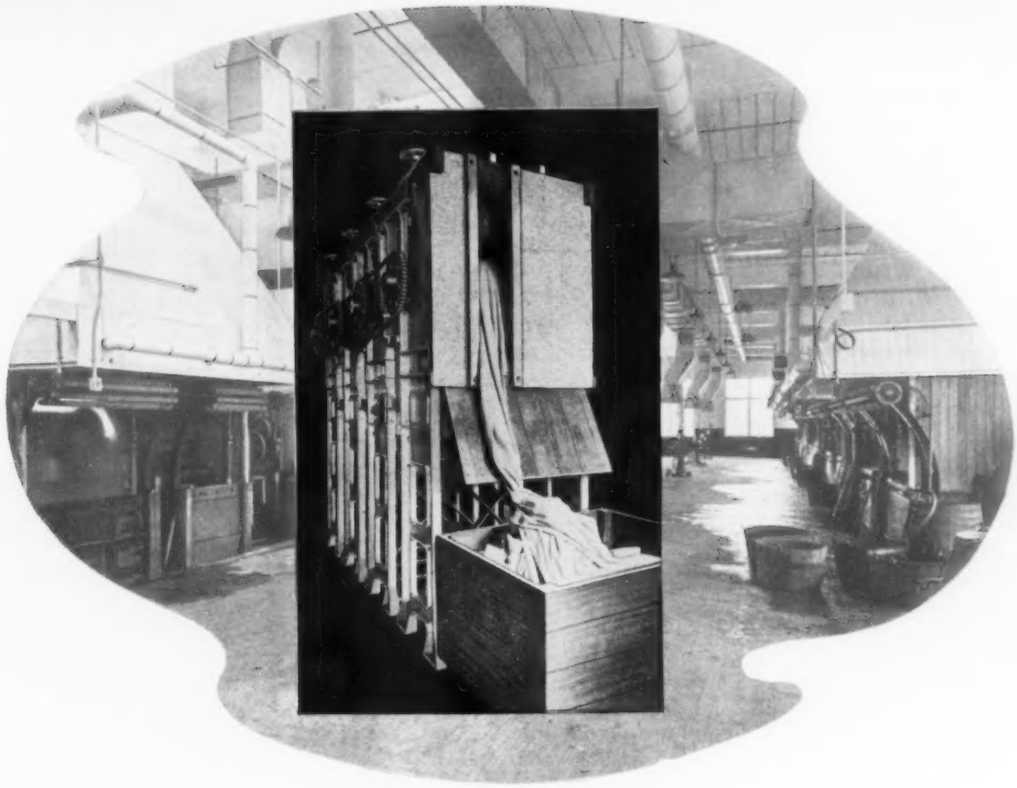
Knitting Looms

During the year two improved knitting looms have been announced. Although the two machines operate in somewhat the same manner, combining the principles of both knitting and weaving, they differ considerably in their construction. Products of the knitting looms include curtains, bedspreads, yard goods, tablecloths, novelty scarfs, upholstery, drapery, millinery and curtain trimmings, collars, cuffs, belts, casket covers, wash cloths, dish cloths, etc.

Spun Rayon

Two developments in the knitting industry which should be mentioned in conclusion are the growing use of spun rayon in knitted fabrics and the recent attempt to popularize lisle hosiery. It appears quite likely that use of spun rayon will be extended to all branches of knitting in the future. Thus far it has probably made its most important advances in the tricot type of warp-knit fabrics. One interesting product is a glove fabric made from a blend of spun rayon and worsted. Rayon and acetate staple have been blended with wool to produce a medium-priced wool sock. For underwear spun rayon should be excellent, as it is very absorbent and can be treated in such a way as to make it resilient.

At the beginning of 1938 a decided increase in the use of lisle yarn for hosiery manufacture was reported. It was estimated that 40 to 50 full-fashioned hosiery mills were experimenting with lisle and that a smaller number of companies were making deliveries of lisle hosiery in sizable quantities. This type of hosiery seems to be particularly suitable and appropriate for sports wear.



Processing Developments

Greatest progress shown in methods and equipment for finishing woolens and worsteds

OUTSTANDING among the technical developments in the processing divisions of the industry is the fact that for the first time in many years advances in woolen and worsted dyeing and finishing methods and equipment lead the parade. Introduction of machines which permit the continuous wet-processing of woolen and worsted fabrics, announcement of a new process for rendering wool unshrinkable, and development of methods for finishing spun rayon and wool blends are examples of the progress which has been made in this field.

The trend toward range processing of woolen and worsted fabrics began several years ago with the introduction of continuous carbonizing machines and continuous washers. Introduction of a continuous dry crusher (shown above) now makes it possible to carry out the entire carbonizing process continuously by means of a range comprising a saturating and acid impregnating machine, dryer and baker, crusher, washer, scutcher, vacuum extractor, and dryer. The continuous crusher—which performs the woolen mill dusting or crushing formerly carried out on rebuilt fulling mills on the batch principle—consists essentially of a series of squeeze rolls through which the cloth passes back and forth, the backward and forward motion being adjustable to give net delivery speeds of 6 to 30 yd. per min.

Skipping for a moment the new processes in wool finishing, in order first to survey machinery developments as a group, we find that the most attention has been paid to dyeing machines of various types. At least four new reel-type dyeing machines have been introduced by as many different manufacturers. While each of these machines differs from the others in detail it is interesting to note that they all are of stainless steel construction and that three of them are of the totally inclosed type. This latter feature not only eliminates dyehouse fog, but effects worth-while economies in steam.

Another piece goods dyeing machine, which can also be used for boiling-off or bleaching, is a progressive jig; the goods enter this machine in the dry state and are rolled progressively on to a series of six cylinders, the lower half of each cylinder rotating in the bath at all times; the machine has a maximum capacity of approximately 3,000 yd. and is available with one long, open compartment or a series of compartments for a sequence of treatments. A new stainless steel package dyeing machine has a specially designed carrier with the manifold so placed that packages can be arranged on both the top and under sides, thus providing a greater flow of dye liquor than would be possible if all the packages were on one spindle. For dyeing worsted, rayon, and mohair tops, a new machine designed to give uniform pressure on all the spindles has made its appearance.

Lacquer prints have continued to grow in favor, and recently a special printing machine has been developed for producing that type of print; this is a single-color machine using a standard copper roll and equipped with a traveling doctor knife which furnishes the lacquer to the engraved roll; cloth leaving the printing machine passes to a festooning machine,

where it is carried in loop form for a distance of 75 ft. before it is wound up on a wooden shell.

Bowed filling has long been a bane to finishers of cotton, rayon, and other fabrics. The finishers have been particularly interested, therefore, in a cloth-straightening control brought out last spring, which employs phototubes to detect bowed filling during the tentering process; this device substitutes electric for manual control of the straightening motor which advances or retards one chain of the tenter in respect to the other to remove the bow.

Other equipment introduced during the period under review includes a 1-ton stainless steel experimental kier; a multiple-roll fulling mill, in which three or four sets of narrow-faced rolls, each with its own crimping box and in its own compartment, are placed side by side, making it possible to run dark and light shades in the same mill; a rope soaper with a triple nip stand, which effects a double squeeze on the fabric; an improved hydro-extractor with corrosion-resisting basket; a double-slot vacuum extractor; improved loop and tenter dryers, the latter employing a new principle of recirculating the heated air through the fabric and not merely across the surface; and a two-operator automatic half-hose boarding machine.

New also are a cloth conditioning machine which operates at a speed of 24 yd. per min. and which has means for regulating the take-up of moisture by the material being conditioned; a print blanket made from latex-impregnated fabric and with an embossed surface which makes it possible to eliminate back grays; a combination steam brushing and dewing machine developed especially for use in finishing staple-rayon and wool blends; a rotary cloth press designed to handle woolen and worsted fabrics at speeds up to 25 yd. per min.; a ball-bearing scutcher in which the frames are made integral with the hangers that support the machine from the ceiling; a power burling table with an adjustable inspection board having a ground-glass panel lighted from the back; improved automatic cloth guiders; a raising brush for shears, which is said to eliminate the problem of ridges on the surface of fabrics; and an inspecting and measuring machine embodying a number of exclusive features.

Dyes and Chemicals

In previous reviews we have commented on the large number of new dyes and chemicals which have been introduced to the textile industry, in recent years. This influx has continued unabated during the last twelve months. Thanks to the tabulation of American dyes made by the American Association of Textile Chemists and Colorists, it is possible to identify competitive dyes sold under various trade names. There is no comparable tabulation of textile chemicals, and the purchaser is more or less in the dark as to the constitution of many of the products sold under proprietary names. A "Dictionary of Textile Chemicals" listing all branded textile chemical specialties and giving their formulas, properties, and applications would be a boon to dyers, printers, finishers, and textile chemists.

New Water Repellent

Unique among water-repellents is a new compound producing a soft, water-repellent finish which is resistant to washing and dry cleaning. Another type of permanent finishing compound is an alkali-soluble cellulose ether which can be applied to cotton fabrics either as a pure size or in combination with mineral fillers. Synthetic resins of various types continue to find new applications, and recently a water-soluble synthetic resin has been introduced for use in sizing rayon and acetate warp yarns and rayon filling yarns.

The shortage of olive oil due to the war in Spain has been followed by development of synthetic and blended lubricants for oiling wool for spinning into worsted yarns, while blended oils are replacing olive oil in the manufacture of textile soaps. Typical of the other textile chemicals brought out in 1937 are a "cold" size for rayon and acetate yarn, a bactericide for use in air conditioning equipment, a glycerin substitute, a compound for removing transfer marks from hosiery which is to be redyed, synthetic detergents, slip-proof finishes, a mercerizing auxiliary, a rancidity retardent for addition to oils and fats, and a variety of wetting agents.

Of the strictly new processes which have appeared since our last review that of rendering wool unshrinkable by treating it with sulphuryl chloride is easily the most important. This process, which was described in detail in our December, 1937, issue, is now being applied commercially in England, where it was discovered, and licenses to use the process have been granted in other European countries, Canada, and the United States. One of the chief advantages claimed for the sulphuryl chloride process is that it gives complete unshrinkability without impoverishment of the wool. The method has been applied successfully to hosiery and other knit goods, yarn, and to tops in the ball form.

Use of synthetic resins for producing wool-like finishes on spun rayon and crush-resistant finishes on cotton and rayon has increased. Another patented process announced recently for rendering rayon pile fabrics more resistant to crushing involves treatment of the goods with a solution of formaldehyde in water in the presence of a suitable catalyst, such as ammonium chloride. Considerable improvement has been made in methods for saponifying acetate fabrics which are to be discharge printed; but there is still considerable difficulty in obtaining accurate control of this process. Particular attention has been paid in the last year to modification of dyeing and finishing operations in order to make them suitable for use on spun rayon in its various forms. This was considered at some length in the September, 1937, issue of Textile World.

New Testing Equipment

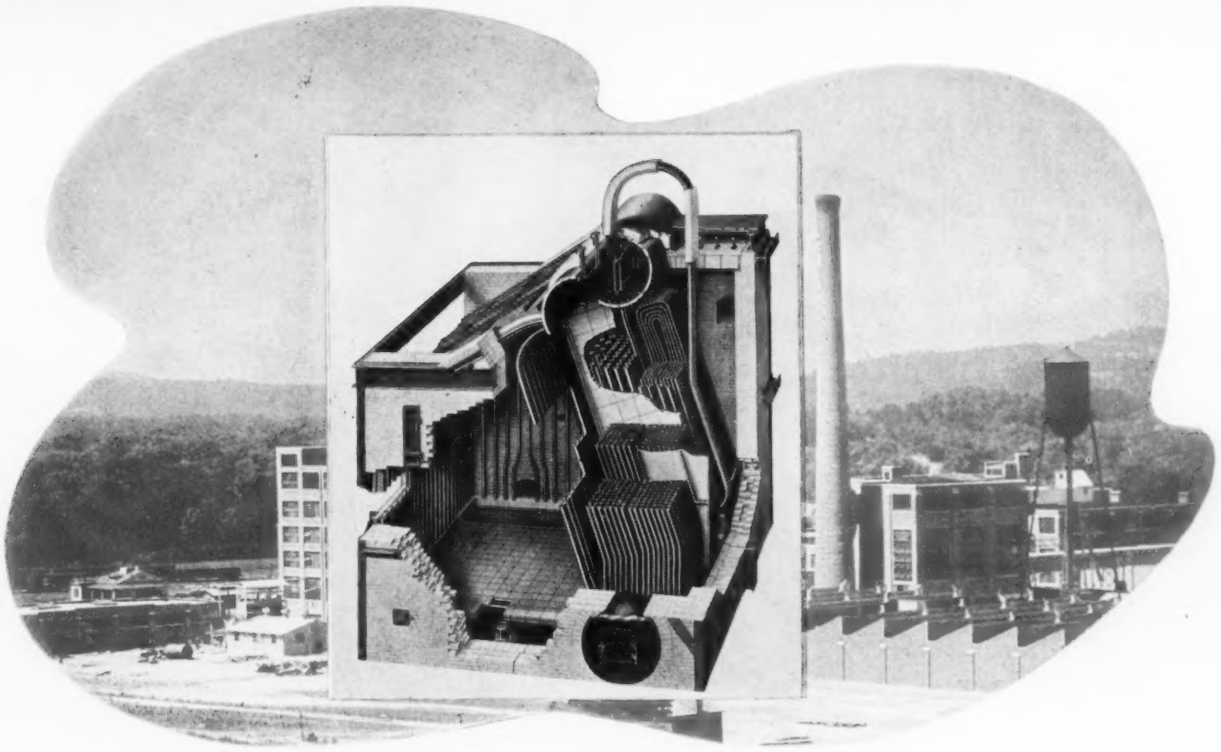
New testing equipment which has been brought out during the last year includes apparatus which offers precision means for measuring the stiffness and resiliency of fabrics and the efficiency of softening and stiffening agents; a so-called universal testing machine for determining the evenness, elongation, elasticity, and strength of yarn by a single testing operation; a portable device for measuring resistance to abrasion; a special micrometer for accurate determination of pile thickness in plush, carpets, etc.; and a device, which stimulates the action of a loom, for determining the action of sizing on cotton yarns and on their performance during weaving.

Researches already completed or still in progress on warp sizing, drying of textiles, chemistry of wool, rayon crepe, and other textile subjects are beginning to prove their worth. Improved testing methods and apparatus are aiding the production of better and more uniform finishes. There is no doubt that there will be further progress in the coming year, and the indications are that much of it will be in the improvement of processes involved in the finishing of fabrics composed in whole or in part of staple rayon.

Guide to Consumption of Domestic Coal-tar Dyes as Shown By Annual Sales Figures

Year	Lb.
1928	98,303,000
1929	106,071,000
1930	89,972,000
1931	85,220,000
1932	73,591,000
1933	98,229,000
1934	84,309,000
1935	97,826,000
1936	117,000,000
1937*	104,000,000

* Textile World Estimate.



Mill Engineering

Higher fuel costs focus attention on methods for increasing power-plant efficiency

PERHAPS THE most important problem that confronts the textile plant engineer at the beginning of 1938 is the rising cost of coal. Due to increased mining costs under the Guffey-Vinson Act, the cost of coal is to be higher; freight rates have also been increased; the probable result will be a 20% higher fuel cost. This means that attention must be given to obtaining better efficiency in steam and power generation and greater economy in general plant operation. With this objective, and in view of the higher fuel cost, additional capital investment is frequently justified.

Under certain conditions, installation of a "topping unit" or "top unit" is the best method of increasing the efficiency of a present plant. As noted in last year's review, this consists of installing a high-pressure boiler or boilers, generating steam at 600- to 700-lb. pressure and 700 to 750° F. This steam passes into a non-condensing turbine, which exhausts directly into the present high-pressure steam main (say at 200 lb. pressure) of the existing power plant. Thus the new equipment is superposed on the present plant. By means of such an installation a considerable number of the present older boilers operating at lower efficiencies can be shut down, and new boilers operating at higher efficiencies can be put into service. In addition, the higher-pressure steam generates a certain amount of power with small reduction in actual heat content before it enters the main that supplies the existing turbines and processing demands.

These new high-pressure boilers are built for stoker, pulverized fuel, or oil operation and are usually fabricated complete in one shop with superheaters, economizers, and air-preheaters. The boilers are of welded construction and the furnaces are usually equipped with water walls. There is always a bypass connection so that steam can be passed through a reducing valve direct into the lower pressure boiler main of the existing plant if the turbine is not operating. There must also be a desuperheater located beyond the reducing valve to bring the temperature of the steam down to that of the lower-pressure steam. In cases of less than full load on the turbine, steam can be passed simultaneously to the turbine and through the reducing valve to the house main. In such installations the entire operation is under a system of automatic control, which not only regulates the coal and air feeds and drafts, but also the pressure and temperature of the reduced pressure steam.

Coordinated boiler units, (as shown above) similar to those installed as top plants, but usually operating at 250 to 450 lb., are beginning to replace older boilers in textile mills. Since they require little headroom and floor space, and no basement, and can be installed in existing power houses with a minimum of alterations to buildings or structural work, they are particularly suitable for modernization purposes. Although the units are adaptable to plants of moderate capacity, they have many of the features formerly available to large plants, and have the added advantage of being designed, built, and sold under one responsibility.

With the increased use of higher steam pressures and temperatures, we find continued research work along lines that are vital to the successful operation of such plants. For instance, it has been found that around temperatures of 1000°F. and above, steel piping becomes oxidized by steam. However, carbon-molybdenum steel gives fairly good results.

The action of boiler feed water on steel, long known as "caustic embrittlement" has now graduated from the lower grades and is known under the name of "intercrystalline cracking." Needless to say, it is just as undesirable acquaintance as before. Recent studies have shown that concentrated sulphite waste liquors from paper mills prevent this action, even under high concentrations of sodium hydroxide and silicate. Sodium sulphite has been in use for some time for the removal of the last traces of oxygen from feed water. It has now been determined that this chemical begins to decompose at temperatures around 530 to 560°F. Investigation of ways and means to prevent, or at least to reduce, the slagging of coal is also under way. Present indications are that salts of molybdenum give the best results.

Pulverized Fuel

Selection of the proper coal for the pulverized fuel furnace brings up several new factors. A high-ash coal is not desirable, since the amount of "fly ash" produced would be large and its emission from the stack would be troublesome. The high-ash content would cause excessive slag accumulations on the water walls of the furnace and would tend to lower the temperature of the combustion chamber. A coal with a low volatile content might give trouble from failure to maintain ignition under conditions of light load with greatly reduced coal feed. In some installations where this trouble has occurred, it has been necessary to use a fuel with higher volatile content and also to cover a portion of the water tubes in the water walls with fire brick. The finer the coal that is fed to the pulverizers, the easier will be the load on them. On the other hand, with finer coal, there will be more loss by dust in the handling and, if the coal is kept in outdoor storage, it will contain more moisture. Wet coal is very undesirable in a pulverized fuel system. Many plants use 1¼ in. or even 5/8-in. slack in preference to the standard stoker grade of 2-in. nut and slack.

With the installation of boilers equipped with pulverized fuel burners, the textile power plant engineer is confronted with a new problem—that of fly-ash disposal. Ash from a pulverized fuel furnace is extremely fine and of light weight, and much of it issues from the stack with the flue gases. There are various kinds of equipment designed to remove this ash from the gases in order to avoid complaints from nearby residents, and special attention has been given to these during the last year. The fly-ash problem is of particular importance to the mill managers themselves, as the ash may enter the open windows, transoms, and ventilators in warm weather and be found on the finished goods or on goods in process. Among the different types of removal apparatus will be found settling chambers, centrifugal concentrators, cyclone separators, and electrical precipitators. These are commonly introduced between the air preheater and the induced-draft fan.

One interesting development in power plant engineering is the recovery of CO_2 from flue gas. The gas is passed upwards through a tower filled with steel filings and coke. Lye trickles down through the tower in the presence of ammonia gas, which acts as a catalyst. Ammonium carbonate is formed by the union of the carbon dioxide and ammonia. This immediately dissolves in the lye, and the ammonia gas released for re-use, leaving the CO_2 combined with the lye. By distillation the CO_2 is liberated and collected. While this development is applicable perhaps only to larger power plants than those found in textile mills, it shows the extent to which the search is being carried for methods of utilizing waste products.

Motors

Several new developments have occurred during the last year in motors for textile use. One of these is the "wind-swept" motor. The matter of fly getting into and clogging the air passages in motors located in rooms where there is much lint and dust has always been a troublesome one. The accumulations in the passages prevented proper circulation of the cooling air and, as a result, the windings became overheated. Wire screens have been much used, but with these the clogging was simply transferred to the screen, and the overheating was still present. In the "wind-swept" motor the screenless air passages are large and unobstructed, and the fans are specially designed and located. All surfaces with which the circulating air comes in contact are smooth, so as not to catch the lint, and the air velocity is sufficient to sweep the passages clear at all times. Coil construction and assembly are such as to give a free path for the air with no pockets where fly could collect.

Another improved motor is designed and equipped to wind cloth on a roll with an even tension from the beginning to a full roll. The varying tension in this operation has always been a source of trouble due to the distortion of the weave, and this trouble differed with the construction and weight of the cloth. This new motor, which is of the d-c. geared type with special windings, is equipped with a rheostat, whereby the speed, and consequently the tension on the fabric, can be adjusted as desired, and this tension is maintained constant from start to finish of the roll.

New types of motors for operating cloth devices for tenters and cloth dryers give quick starting and stopping, thus eliminating the "hunting" action which has been so common and undesirable in the older installations. Disk types of magnetic brakes and vacuum switches operated by the feeler contacts insure quick, positive action and control.

Drives

For the last several years the pivoted motor base drive for short centers has found much favor for use in textile mills. Since the introduction of the V-belt drive that also has found extended use. Now as a development of the last year we find the two combined in one unit that produces a drive more flexible and more adjustable than was either of its components alone. When the drive is at rest, the tension on the V-belts is relaxed, resulting in longer life for the belts. Another improvement in transmission equipment is the practice of providing combination ball and roller bearings for idler pulleys. This is of special interest in connection with spinning and twisting frames for silk and rayon. While the roller bearing takes the direct pull, the ball bearing at the foot of the unit carries the vertical thrust load. Proper lubrication of idler pulleys has always been a serious problem and if, as claimed, this new method requires oiling but once in every 10,000 hours of operation, it may well be admitted that success in this objective has at last been attained.

Several trial and larger installations have been made of the Energy drive for looms, which was commented on in last year's review, and performance reports on this type of drive should soon be available. In the fall of 1937 a leading manufacturer of leather belting completed the construction of a traveling laboratory for demonstrating results obtained with various types of belts and drives. This mobile laboratory is touring in various textile centers, making tests and demonstrations for engineers and other mill executives.

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Textile World

FEBRUARY 28, 1938

INDUSTRIAL RELATIONS SECTION

EMPLOYEE RELATIONS

In textile industry have made dramatic progress in 25 years

Introduction by DOUGLAS G. WOOLF

WE CLAIM no brilliance of thought for having isolated industrial relations as the subject for this special section of our Annual Number. As a theme for a 1937 review and 1938 forecast, it was a "natural." It isolated itself, so to speak. All during last year it stood out as Public Problem No. 1.

That, we believe, is the primary difficulty with the present situation. This very prominence which the subject attained last year led people to believe that here was a new problem, demanding new and emergency measures. As a matter of fact, it is industry's oldest problem, and there is nothing new about today's version of it—except possibly the eyebrows.

And so, we think it is rather important to put down in one place a record of an industry's experience and status in employer-employee relations; to take stock, as a guide for future action.

That is what we are attempting to do in the succeeding pages, through a series of general articles discussing major phases of the situation, and a group of stories reporting on experience of individual companies in this field.

In planning this issue, we have thought of the textile industry as a whole. If, therefore, certain of the general articles and a large number of the case studies have their locale in the South, it is merely because the background of that section has created more specialized problems than now exist in other sections. In the continuing progress toward the solution of those problems, however, the whole industry has a vital interest.

The selection of companies for inclusion in the group of case-studies, while not at random, was also not particularly scientific. All we tried to do was to get a collection which would represent a fairly average cross-section of the industry and we think that's what we have.

So much for the background of this section.

Now Go on with the Story

This, we have said, is an age-old story. However, we do not intend to dip into the dim past. We shall confine this introduction largely to the period of our personal experience in the textile industry: something over 25 years.

That period, incidentally, has had all the change in it that any craver of excitement could demand. It spanned the last years of the pre-war era, now almost a fable; the wild days of the war and post-war inflation; the depression and recovery periods—and, more recently, the recession. Probably never before in a quarter of a century have so many different strains been placed upon employer-employee relationships. The progress that has been made in that phase of this particular industry, despite those strains, has been spectacular.

We find it easier to express that progress in terms of our own experience, rather than statistically. We got our first job in a textile mill in 1911. It was an average plant, we think, located in the Middle Atlantic States. Most of the pay envelopes during the three years we were connected with it ranged between $7.50 and $10.00 a week for 55 hours work. Most of the employees had large families, and as there wasn't a great deal of family employment, the standard

CONTENTS

Industrial Relations Section

GENERAL ARTICLES

	Page
Introduction	79
Wages and Hours	82
Textile Education	84
Comfort and Safety	86
The Mill Village	88
The Mill Store	90

INDIVIDUAL COMPANY STORIES

Kendall Co	92
Marshall Field & Co	92
Pepperell Mfg. Co	93
Chatham Mfg. Co	94
Avondale Mills	95
Cone Group of Mills	98
American Woolen Co	99
Assabet Mills	99
Berkshire Knitting Mills	100
U. S. Rubber Co.'s Mills	101
Pacific Mills	104
Manville-Jenckes Corp	105
West Point Mfg. Co	106
Martha Mills (B. F. Goodrich Co.)	107
Firestone Cotton Mills	110
Stillwater Worsted Mills	111
Carlton Yarn Mills	111
Hudson Silk Hosiery Co	112
Joanna Cotton Mills	113
Wiscassett Mills Co	116
Parker School District	116
Stonewall Jackson School	118

of living was not what could be termed high.

The life of the average worker, in fact, struck us as rather appalling. He would arrive at the plant at seven o'clock in the morning, have an hour for lunch, and leave for home at six o'clock at night.

The plant itself was in bad shape from the standpoint of working conditions; the tenements provided bare shelter and nothing more; there was little chance for the workers to go anywhere or do anything except participate in the Saturday night debauch.

We are trying to keep this account on the dispassionate note, and consequently shall forego some of the color which is associated with the above story in our own memory.

And, Today:

The scene changes. As we wander around textile mills today, the first thing we are impressed with is the amount of leisure the workers have—all of them, understand. The sight of a change in shift at 3:30 in the afternoon, with the knowledge that hours of daylight, particularly in the summer-time, are ahead, is still one of the most dramatic experiences in our contact with the industry. No matter how often we encounter it, we still thrill to it. That leisure, plus the two-day week-end, has completely altered the life of the textile worker.

In the utilization of it, he has so many outlets which the 1911 employee did not have: the automobile primarily, municipal or mill recreation facilities, the movies, the radio. And he can afford them, thanks to the sharp increase in wages during that 25-year period.

Living conditions, in villages owned by mills, also present a new aspect. The houses which have been erected in recent years bear little resemblance to those of the early villages.

Working conditions have made similar strides. As one who sees a good many mills, we can testify to the steady progress each year in the comfort and safety surrounding the textile operative at work.

These and allied subjects—wages and hours, the mill village, the mill store, comfort and safety—are treated in the articles immediately following this introduction. We call our readers' particular attention to the fact that each of these is truly a progress report. In no one of these phases is there a static situation. That, to us, is the most encouraging feature of textile industrial relations.

LEISURE: "The sight of a change in shift at 3:30 in the afternoon, with the knowledge that hours of daylight are ahead, is still one of the most dramatic experiences in our contact with the industry"

Courtesy Pepperell Mfg. Co.

Enter the Real Hero of the Story

Thus far we have been talking mostly about material things—conditions which tend to make life more comfortable and more pleasant. Most of this doesn't necessarily mean *growth*, unless one regards the automobile, the movies, and the radio as stimuli in that direction. And we don't intend to get on that battleground.

However, there *is* one trend under way which is changing, and threatens to change still more, the whole psychological make-up of textile employees.

That is our old friend, education.

It is hard to know where to start on this subject. There are so many angles to it. There is the vast improvement in school facilities in both towns and mill villages. There is also the noteworthy extension of vocational education. There is the increasing effect of the textile schools upon mill personnel.

But beyond these specific gains, there is an intangible desire for educational advancement which, in our opinion, is the dominating force in the industry today. That desire started, of course, from the people themselves. Particularly in the South has the new generation displayed an attitude far different from that of its predecessor.

However, it might have stayed largely an attitude if the industry had not done something about it. It has—both collectively and individually. Collectively, it has participated in the remarkable textile program under the auspices of the Textile Foundation, described in a subsequent article. It may be argued that this has a bearing on the upper ranks only. On the contrary, even though the direct impact is upon those destined to be key-men in the mills, the ultimate result will be a raising of the educational level of the entire industry.

A similar impulse is coming from the efforts of individual manufacturers. In many cases which we studied, we found first consideration being given to group training of foremen. Here, too, this action does not stop there. The proper follow-through means that this educational uplift spreads throughout the organization.

It is impossible to over-estimate the importance of this development. Those companies which are doing a conscientious job in this direction are finding that it pays big dividends.

Employee's Voice Is Stilled

There is another all-important phase of industrial relations: employee representation. We have followed developments of this phase since those hectic post-war days when plans to that end became involved with other so-called "welfare" activities in the competition for help.

There was, thus, a conflict of pur-

pose. To some manufacturers, without doubt, they appealed merely as window-dressing in the sales effort necessary to attract help—unbelievable as that may seem today. To most, however, those plans offered a possible solution of that increasingly difficult problem of maintaining personal contact with employees as the organization grew.

The late H. R. Fitzgerald, for example, had that as his sole motive. We know, because we talked with him many times about it. So too, did Sidney Blumenthal and other manufacturers who followed the road known as "industrial democracy." That was the impulse which guided Harold Hatch in his "partnership plan" experiments at Dutchess Bleachery and elsewhere.

Some of the earlier plans were found on experience to be too cumbersome and gradually more workable programs emerged. In the later stages, we had the Pacific plan, the Amoskeag plan, the Cheney plan, and many others.

In our opinion that whole trend was of vital importance. It would be today, too, if it had not become involved in a political mess. By an amazing chain of events, the attempt of an employer to give his employees a voice in the management of the company has become something shady, reprehensible, and subject to punishment. All this, because in a few cases a so-called company union was used as a weapon against an outside union.

The Riddle of the N.L.R.B.

Sooner or later, it will be found that the outlawing of attempts such as those described above has had a seriously retarding effect on progress in industrial relations. It is one of the reasons why students of social progress look aghast at the National Labor Relations Act.

Eventually, this will be changed and then the past experiences of the textile industry in employee representation will come in handy.

Involved in this subject, of course, is that of unionization. We have no desire to duck that subject. However, we planned this section as a presentation of the *positive* story of textile industrial relations. Unionism in this industry has nothing positive to its credit. The United Textile Workers of America have such *negative* records as the appalling strike of 1934 when the rank and file of the employees had to fight against an armed minority in an attempt to remain at their jobs. The new Textile Workers Organizing Committee has nothing in its record except a membership drive. The agreements it has signed with mills have contained no provisions concerning wages and hours which were not standard practice in the branch of the industry involved. It is as important, to date, in the textile industry as a country club would be in a community if the "club" had no golf course, no club house, no swimming pool, nothing except some signed membership cards.

When and if the T. W. O. C. becomes a positive force in this industry, it will rate a place in a progress report of this nature.

The Element of Change

We referred previously in this article to the changes which have taken place in the succeeding generations of textile workers. In our own experience we have seen an entirely new generation appear. It has different needs, different demands, from those of the generation which preceded it.

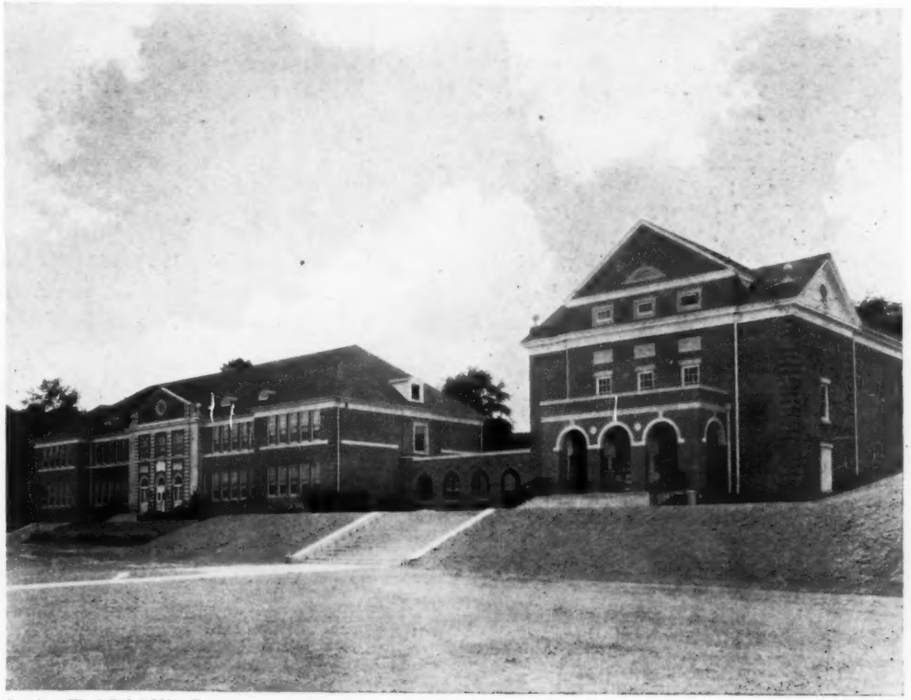
Particularly is this true in the South, where the textile industry has been far more than a branch of manufacture. We have called it a great socializing force—and we cannot overemphasize that point.

Naturally, textile executives were a little slow, at the start, in adjusting themselves to this new type of personnel. Accustomed by previous experience, and often by the heritage of their families, to a people who wanted their lives directed for them, these mill men could not at once drop the role of protector. In fact, the need for that role has not been eliminated; it has merely been lessened. But its importance becomes less and less each year. Gradually, this fact has become apparent to manufacturers. That is why each item in textile industrial relations has had a record of progress in the last quarter-century.

The Wage Problem

This industry cannot yet stack up its employer-employee relationships against all industries in the country. The reason is that its wage scale is still too low for that. The great new industries, such as automobiles, have been created almost overnight while textiles date back to the ages. The former have been able to build an economic structure from the ground up; the textile industry on the other hand has been handicapped by an out-moded economic organization.

***EDUCATION**: "There is one trend under way which is changing, and threatens to change still more, the whole psychological make-up of textile employees. That trend is our old friend, education"*



Courtesy West Point Mfg. Co.

And yet, in the last few years it has made more progress in percentage of wage increases than any other industry. Compared with the great majority of low-wage industries and with the entire field of trade and service, textile manufacture ranks at the top in industrial relations.

The story, told in this section, is one of which the industry may well be proud.

WAGES AND HOURS

Spectacular social progress made by textile mills in last five years

DESPITE occasional short intervals of interruption or relapse, the history of the cotton-textile industry during the last five years has been a history of progress. Particularly impressive is the industry's record relative to the volume of employment, wage rates and hours of work. These five years of progress are in startling contrast to the preceding five years which were characterized by almost unbroken retrogression.

In order that this contrast may be fully appreciated, I shall base my analysis on the ten-year period, 1928 to 1937 inclusive. The number of workers employed by the industry in 1928 and 1929 averaged about 424,000. Thereafter, this number was steadily reduced until the low point was reached in 1932 with average employment of only 301,000. The upward trend which began in the spring of 1933 continued with but few interruptions to the spring of 1937 when the industry was employing 467,000 persons which represented an increase of 166,000.

The average employment for the entire ten-year period was 387,500. The 1937 average, despite the drastic recession of the last few months, was 442,000, the highest of any year since 1927. It exceeded the ten-year average by over 54,000, and was higher than 1936 by 31,000.

Hourly Wages at High Level

As is to be expected, hourly wage rates in the industry have behaved in much the same fashion as the volume of employment. In 1928 and 1929 they were approximately 32½c. per hour for the entire industry. From the autumn of 1929 they moved steadily downward until the low average of 24c. per hour was reached in 1932. During the period of the National Industrial Recovery Act which ensued, wage rates in the industry averaged about 37½c. per hour. After the invalidation of the N.R.A. these rates remained virtually unchanged until December, 1936, when another upward trend was inaugurated. In January, 1937, the average rate was 39c. per hour and by May it had reached 42c. per hour. During the summer of 1937, the average rate was 42½c. which has since been maintained. At the end of 1937 wage scales were at the highest level obtaining in the industry since the inflation years of 1919 and 1920.

By CLAUDIUS T. MURCHISON
President,
The Cotton-Textile Institute

✦

The dramatic progress which the textile industry has made in the direction of social objectives during the last five years forms a most remarkable industrial romance. It is told in the accompanying article for one division of the industry but similar facts apply for most other branches . . . . As Dr. Murchison states: "Given nothing more than double-shift operation, the industry is now standing on the threshold of stability. It can promise a continuance of its great contribution to our social and economic system

✦

Equally spectacular have been the changes in the standard work-week for individual employment. Prior to 1933 the standard work-week for the greater part of the industry was 55 hours, Massachusetts being a notable exception with 48 hours as the standard. Owing to the irregularity of mill operations, these standards were never reached in actual practice as an annual average. For example, in 1929 the average hours worked per employee were only 48.2. During the worst year of the depression when employment was at the minimum, average hours worked per person were 45.1.

N.R.A. Set 40-Hour Week

The N.R.A. established for the entire industry a uniform standard work-week of 40 hours. However, in 1934 and 1935 the average time actually worked was about 34 hours. A steady increase in average working time occurred in 1936, and by the spring of 1937 industry operations were so active and so regular as to permit practically full-time wages for all the workers in the industry.

By midsummer, 1937, the business recession began to be reflected in shorter hours, and by December average time worked per person probably did not exceed 27½ hours per week. It is gratifying to know that the industry met this crisis by a policy of spreading the work rather than one of laying off employees. Unfortunately, a number of mills had to close entirely and a limited number of lay-offs were naturally necessary for most mills. Production curtailment averaged one third or more yet actual separation from the payroll of the first half-year amounted to only about 17%.

There are but few manufacturing industries which can boast the retention of 83% of their maximum employees during this difficult period. It was made possible by the willingness of the industry to operate at heavy losses, build up burdensome inventories, and stagger the available work in such a way as to provide at least 60% employment for the bulk of the workers. The industry's tenacious adherence to the highest wage scales which have been known since 1920, despite the intensity of the present depression, is ample evidence of its determination to continue and,

if possible, improve upon the high standards which were inaugurated during the period of the N.R.A.

Through the establishment of the 40-hour work-week the workers have more abundant leisure than they have ever previously known for recreation and to integrate themselves into the social life of the community. At the same time, the increase in the hourly wage rate has been more than sufficient to offset the shorter hours from the standpoint of the weekly pay envelope. If and when business conditions permit full-time mill operations, average weekly earnings for the industry as a whole at the present hourly wage rate will amount to $17.00. For the five-year period from 1928 to 1932 inclusive actual weekly earnings in the industry averaged $13.65 for an average work week in excess of 46 hours. The worker has obviously made big gains financially, physically and socially, and there are more of him to enjoy the gains.

Progress Brings Problems

But the industry has not accomplished these things by any such magic as pulling white rabbits out of a hat. A price has been paid, and let us hope that it was not too high. In the first place, the establishment of the 40-hour work week made impossible the continuance of single-shift operations. The machine capacity of the industry is not sufficient to satisfy consumption requirements on a 40-hour per week basis. There are, at the present time, only about 27,000,000 spindles in place in the industry. Had all these spindles been running in 1937 they would have had to operate on an average of 71 hours a week. In 1936 they would have had to operate 67 hours a week, and in 1935, 56 hours a week.

Perhaps the best test of the industry's present ability to manufacture cotton goods would be to count as available for production the highest number of spindles operated during the first half of 1937. That number is 24,748,000. With these active spindles as a basis the average demand for cotton goods in 1937 would have required a single shift of 76 hours. The demand in 1936 and 1935 would have required shifts of 73 hours and 60 hours respectively. Even in the old days prior to N.R.A., when the spindle equipment of the industry was vastly greater than now, single-shift operations were possible only because of the tremendously longer working hours.

Single Shift Not Economic

At present it is obviously not within the scope of economic possibility to operate on a single shift. There is, of course, nothing to prevent the individual mill from operating on a single shift if it so chooses, irrespective of the industry's relationship to the market when viewed as a whole, but such a procedure would quickly lead to insolvency because of the excessively heavy burden of overhead expense which would be attached to the limited output.

There is, apparently, no half-way ground. If the hours of individual employment are to be 40, the hours of machine operations are then logically 80.

The necessarily remorseless application of this logic has brought bitter consequences to many mills and communities. During the period from the inauguration of N.R.A. to the middle of 1936 demand for cotton goods was not sufficient to support double shift operations for the industry as a whole. In consequence, the process of whittling down the industry's capacity by insolvencies and voluntary liquidations pursued its pitiless course. For a few months in 1937 it appeared as if this situation had been finally corrected and that in fact the pendulum had swung the other way.

At the point of its highest level of activity in the spring the industry was operating its active spindles at a rate of about 86 hours per week. We now know that these operations were abnormal, and there is good reason to believe that when we next reach the plateau of normal consumer requirements there will be a well-balanced relationship between total market requirements and double-shift operations.

The Third-Shift Threat

There is, unfortunately, another angle to the standard 40-hour work week which gives cause for concern. A 40-hour week naturally implies an 8-hour day. It so happens that 8 goes into 24 exactly 3 times. This carries with it the almost irresistible suggestion of three shifts. The 40-hour week was not adopted for historical reasons. It is not the result of nice calculations of a proper balance between production and consumption. It did not spring from any exact measurement of the physical capacities of the employees.

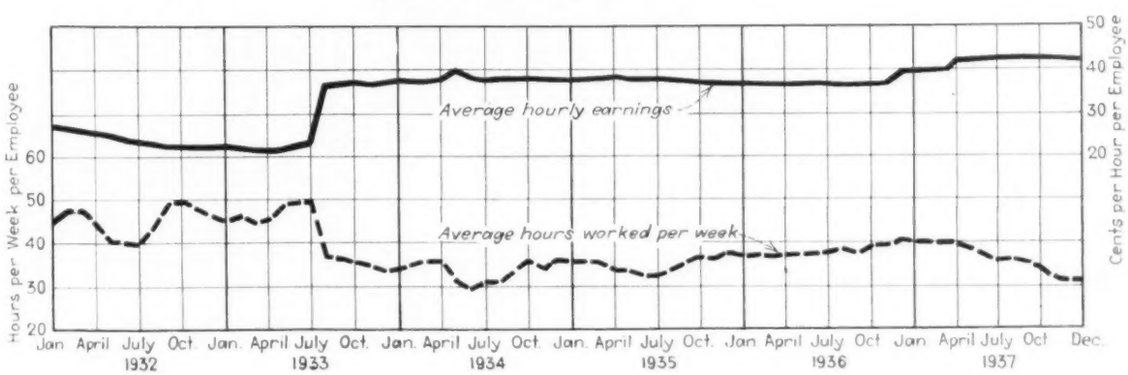
Its selection in all probability was due chiefly to predilection for a number that made time keeping easy, while also being small enough to satisfy the clamors of the moment. Without meaning to be too facetious, what I have in mind is the thought that a 42-hour standard work week would not have been such an open invitation to the use of the third shift.

But why bring that up?

Fortunately, the third shift is at present more of a threat than a reality, and it is to be hoped that the sound judgment of the industry will prevent its realization. If the third shift should, by gradual stages, become general throughout the industry within another ten years, its growth will be characterized by continued liquidation of the industry's equipment, excessive competition and the chronic overproduction which necessarily accompanies such a transition.

Given nothing more than double-shift operation, the industry is now standing on the threshold of stability. It can promise a continuance of its great contribution to our social and economic system.

Curves prepared by Cotton-Textile Institute from Government figures showing wages-and-hours trend. (July 1933 marks the start of NRA)



TEXTILE EDUCATION

Its past development unique; its new experiment unparalleled

By FREDERICK M. FEIKER
Textile Education Consultant for the Textile Foundation

FEW, even in the textile industry, realize the unique place that specialized textile training occupies in the field of education in the United States. Fewer still probably know that this unique development was fostered by early and present leaders of the industry itself. These specialized educational institutions for a great industry, now available in Lowell, Fall River, New Bedford, Providence and Philadelphia, and in the textile departments of the six engineering colleges of the South including North and South Carolina, Georgia, Alabama and Texas, together comprise a series of textile educational centers which has no parallel in other industries. In a word, the textile industry has a capital asset in education of which it has a right to be proud and out of which will come a continuing and increasing flow of trained men with specialized knowledge available for its future development.

As is now generally known, the Textile Foundation sponsored in 1933 an inquiry into the "Training of Men for the Textile Industry." A report was issued under that title in February, 1934, and since then there have been reported from time to time in the technical press the cumulative results which had followed from the earlier inquiry.

This inquiry into the needs and the educational procedures for training young men, which has been sponsored by the Textile Foundation for the last five years, could not have been proposed at a more favorable time. Technical education in all its branches has been held up for critical scrutiny during these years and it is significant that the trend of discussion of technical education as a whole has taken somewhat the same form as that which has developed in the field of specialized textile education, namely, "How may young men trained in engineering be better fitted to meet the trends in social and economic life that technology itself is in part responsible for?"

The Textile Foundation has from the beginning looked upon this educational movement as a cooperative undertaking with the deans of the textile schools, so that the representatives of the Foundation and the representatives of the textile institutes, schools and engineering colleges have together constituted a sort of committee as a whole for interrelating the educational programs of the schools with the needs and trends of the industry. Leaders of the industry have addressed the meetings from time to time, pointing out the educational needs and educational opportunities. Similarly, leaders in thought in fields of style, design, color and management questions have met with the heads of the textile schools at these meetings to provide a background for the development of educational policy in the different schools, as well as the development of teaching materials.

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No phase of textile industrial relations is more vital than textile education. And no man is better equipped to discuss the past and the future of that phase than Mr. Feiker, who has conducted the remarkable textile-school program of the Textile Foundation

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Unparalleled in Other Industries

Here again, there is no parallel in any other industry in coordinating the relation between the educational institutions and the trends and problems of the industry. No educational procedure is ever settled and the genius of the program that has been carried out by the deans of the schools in cooperation with the Textile Foundation lies in the fact that the programs and the meetings and development of detailed materials for teaching are evidence of an aliveness and an awareness, both on the part of the industry and on the part of the schools, of the importance of their mutual relationship.

As one participating in this movement to correlate and coordinate, insofar as practicable, the needs of the industry for trained men with the institutions that are available for such training, the progress that has been made is a constant inspiration. New ground in educational procedure has been cultivated. and, again, the industry has a right to believe that in this particular branch of its development a forward-looking program has been promoted holding to the ideals of the place of education in our democracy with special reference to providing training for the leaders of the future.

Textile mill men expect a very high ideal of graduate from a textile school. To fulfill this expectation it would be necessary to combine—let us say—instruction in general business and engineering education plus a vocational training in textile practice. This is a large order. Obviously, no attempt should be made to standardize institutions but rather to provide the opportunity for each institution to individualize its relationship to a many-sided industry in such a way as to make the best of its equipment, its teaching staff and its service to those fields of the textile industry which come closest to it.

To summarize this ideal in another way is to suggest what is sought as a type of industrial education that is part business, part engineering and part textile practice. What the deans of the schools are seeking is a kind of training which keeps the best of the present school basis but to which is added the point of view and perspective of management. There is unquestionably more than one kind of educational service involved and therefore, it is not desirable for all institutions concerned to aim at the same objective. Some schools may be vocational, some are pre-professional in character and others are professional character.

As these questions have been developed by discussion within the group, certain practical steps have taken the discussion out of the field of generalities and provided specific information and aid. One of the earliest of these recommendations was the approval of a plan for bringing together the teaching materials

in the field of cotton textile manufacturing—and, under the leadership of Dean H. H. Willis, with funds provided from the Textile Foundation, a series of teaching texts has been developed in this field.

Since the field of economics and management from the beginning also seemed to provide special opportunity for development and training, a second practical undertaking has been made possible by cooperation with the Wharton School of Business in developing a series of teaching materials in the field of textile management. Again, the Textile Foundation has generously supported the movement by providing funds at the request of the deans of the schools for the preparation of four books on teaching materials: one having to do with analysis of economic factors in the textile industry, a second on textile mill management, a third on marketing and a fourth on costing from a management viewpoint.

The projection of this teaching material for the use of students in the various institutions rests on the desire to provide the young men who graduate with some background of the size and character and the immense variety of the great industry which they will enter as graduates. There is not opportunity in this brief summary to record the background for this development completely, but it is worthwhile to point out that the problems of the textile industry today and the problems of tomorrow are enormously more complex than they were when the schools were first established.

Group of textile school deans surrounding Mr. Feiker (at center of cross-table) at a recent conference. At left of Mr. Feiker is E. T. Pickard, secretary of Textile Foundation and at right is Franklin W. Hobbs, chairman of Textile Foundation

The Manager of Tomorrow

The assumption is that the manager of tomorrow must know, first, the technical aspects of production; second, the principles of production management including among them plant layout, the routing and scheduling of production, the control of inventories, costing, etc.; third, the management of the labor force, including best practice in selection of workers, promotion, training, compensation, etc.; fourth, a view of financial management, at least covering methods of securing capital and their relative advantage, as well as a company's relations with its bank and financial sources; fifth, the marketing of textiles—the various methods of distributing the product and their relative advantages, where textiles are consumed and why; and finally, what for lack of a better phrasing, may be termed the economics of textile manufacturing. By that is meant the desirability of giving young men a picture of how the great industry they will enter, first, satisfies human wants for goods; second, provides a way of life for thousands of mill hands, overseers, superintendents, clerks, agents, brokers and others; and, third, supplies profits (and losses) for the owners.

In other words, an attempt here is to give a young man a view of the field of industry through the eyes of a business man, providing a useful product for the public, employment for his workers and profits for himself. Issued, as it will be, in four volumes of specific information, this material in general supplements the studies of processes by which textiles are made, which constitute the other part of courses in textile institutions.

A third stage in the development of coordination between industry and the educational institutions is noted in the chronology as a seminar for the teachers of economics, accounting and marketing, held in New York in June, 1937. Having brought together in organized form the teaching materials outlined above in the general field of economics and management and marketing and costing, discussions with the heads of the departments of economics and the instructors in economics in the various institutions indicated the desirability of bringing together the representatives of the schools in these departments and the representatives of divisions of the industry.

Fine Spirit of Cooperation

This review of a fruitful experiment in specialized education would not be complete without emphasizing the fine spirit of cooperation that has made advance possible. There has been a full attendance of representatives of the institutions at every meeting during the five years. Two of the institutions are completely re-making their courses as a result of the developments. All of the schools have adopted some of the recommended procedures. One institution is about to erect a new half-million dollar building for textile education. Another has remodeled its former building and has planned a four-year course leading to a degree, as well as continuing its two and three-year certificate courses. A third has made arrangements with a university for the teaching of mill management.

Those who have been associated in the movement with representatives of educational institutions, or representatives of the industry, have been imbued with a common spirit of enlarging the opportunities for trained men in the industry. If this educational experiment which has been made possible by the Textile Foundation indicates anything, it is that the leaders of the industry and the leaders of education are looking forward to add to the accomplishment of the past and to the vision and enthusiasm of the pioneers.

The textile industry is the only great industrial enterprise which has reorganized education so concretely as a part of its total progress. The textile industry has set standards of consumer acceptance in a variety of style and beauty and quality, as well as standards of decent living, all of which call for men trained to carry out these ideals.

Education was recognized in 1880 or 1890 as a way to meet the future as well as the immediate needs of the industry. The present marks an epoch in the development of the textile industry and in the same spirit which guided the founders of textile education, those who are responsible for education in the present day have sought to restate the industry's objectives and to visualize the educational needs to reach these objectives. It is perhaps not too much to state that the Textile Foundation through its leadership and sympathetic understanding, has dignified the purpose of textile education and placed it where it belongs as an essential part of the development of a great industry.

COMFORT AND SAFETY

Of employees have been incentives for major improvements in textile plants

By A. W. BENOIT
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MUCH has been done in recent years in the development of textile machinery and the elimination of operations and processes to reduce the manufacturing costs. These changes have claimed much of the attention of the mill management and have taken the larger part of the expenditures for plant improvement. But the welfare, health, and comfort of the employee have also come in for considerable thought, and as a result, major improvements have been made in conditions surrounding his employment.

Improvement over 25 Years

Anyone who is sufficiently advanced in years to have had experience with the mills of 25 or more years ago, has only to recall the conditions that prevailed at that time in many plants to realize how things have improved. Low-storied, poorly lighted rooms with small dirty windows that could, like a railway coach window, be opened only in rare cases; multitudes of belts and whirling pulleys just above one's head; odorous and ill-kept toilet rooms with wooden partitions, slimy, rusty cast-iron sinks supplied with cold pond or river water, and only a sketchy attempt at privacy; narrow spiral stairways that were masterpieces of carpentry and disastrous in use; unguarded belts, pulleys and gears that took an awful toll of human parts each year; narrow working alleys with worn splintered floors that made work difficult and hazardous; dye-houses and wet-finishing rooms with slippery, sodden plank floors and a dense fog from the floor to the ceiling; nauseating odors, intense heat, and harmful fumes where special processes were being carried on:—such were the conditions most frequently encountered in the older mills of that time and which only on rare occasions will be met today.

The mills that have been erected in the last 25 years have shown a definite trend toward improvement of conditions affecting the safety, health and comfort of the employee, but it has been a long up-hill struggle to achieve this result and it has been brought about by many conflicting forces. The management has advocated some of the changes, prompted by a dual motive: to better conditions and at the same time increase production and lower costs. State and city safety and fire ordinances, and legislation prompted by social workers, have contributed their quota, especially with regard to stairs, doors and wash room facilities. Liability insurance companies have made it profitable, in addition to being humane, to guard hazardous machinery and moving parts and make all possible provisions for the safety of employees. Above all these forces is the great common desire to make human labor safer, easier, and pleasanter.

The buildings erected and machinery installed in each period of

Improved washroom facilities

expansion of the industry have shown a marked improvement over their predecessors in the features having to do with the welfare of the employees. Full advantage has been taken of the rapid advance in the design and arrangement of the equipment used in mills. The desire of one day became the reality of the morrow and things considered luxuries in one period were the necessities of the next. The investment in many of the features, regarded by some at the time of installation as "catering to the help," returned good dividends to the management and led to a further study of the possibilities.

One of the early developments was the change in the structural design of mill buildings, prompted by utilitarian motives, but which resulted in a much more desirable working room. The story heights were increased, spans and bays made greater, reducing the number of columns, and the windows were made much larger and higher, with ample ventilating areas.

The advent of steel beams in place of wood added to the possibilities, and the use of large steel sash with easily opened ventilators permitted unlimited quantities of light and sunshine and fresh air.

These same changes permitted better arrangement of machinery with good working spaces, ample trucking alleys, and good floors. The machine rooms became comfortable, pleasant places to work, especially when compared with former conditions.

Coincident with the above, more attention was given to stairs and exits; studies were made and ordinances passed governing the width of stairs and landings, width and type of doors, the arrangement of exits and the isolation of stair wells by fire walls. Safety treads were added to make the footing more secure. There is gradually being adopted, and required in some localities, the practice of making all parts of stairs and enclosures of non-combustible materials. Every reasonable precaution is being taken to insure the safety of the employees under normal as well as under panic conditions.

Wash-Room Changes Spectacular

The most spectacular change which has been made is in connection with the toilet and washing facilities, probably because there was so much to be done and because there has been so great an advance in the equipment available in the last few years. Wash rooms now have waterproof floors of concrete, sometimes with tile or other decorative top finish, well drained and easily cleaned. The fixtures are of vitreous ware or enameled cast-iron, of sanitary construction, attractive in design, and in-

stalled in accordance with the latest established requirements. The wash bowls are equipped with hot and cold water and soap dispensers. The closets have well designed sanitary steel enclosures. Ventilation may be provided by ventilator sections in the sash or by exhaust fans. In plants where there are operations that leave the employee dirty and dusty at the close of work, shower baths are provided and meet with favor.

Secluded rest rooms, where employees who are taken ill may retire, are now provided in many plants. Such rooms are comfortably furnished and have toilet facilities.

Most plants today have a first-aid room where the necessary equipment is provided to care for and dress minor injuries and give temporary relief in major cases pending the arrival of a doctor or ambulance. Most plants also have stringent rules requiring that all injuries, no matter how slight, shall be reported and treated at once.

Frequently this is carried further and a nurse is kept in constant attendance or a doctor is engaged to make periodic visits and check the general health of the operatives. This acts as a preventive of physical ailments and reduces the loss of wages due to that cause. The value of such service depends upon local conditions

A mill cafeteria

and the responsiveness of the employees.

Lockers are being provided where each individual may safely keep his outside wraps and other clothes not worn at work, doing away with the unsightliness and possibility of damage due to having them hung on hooks and nails all over the room. The lockers may be all in one room, which is kept locked or guarded between periods, or they may be in small groups adjacent to the operative's place of employment. Various arrangements are possible and a scheme acceptable to the employees must be worked out or they will not use the lockers.

The old tin cup chained to a nail near the drinking water faucet is gone, and its place has been taken by bubbling drinking fountains or paper cups. Frequently, today, the drinking water is chilled in summer to a desirable temperature, and fountains are placed at many convenient places. This adds to the comfort of the employees and encourages them in healthful drinking.

The inner man has also received much attention. Cold, unsatisfactory lunches undermine the health and morale of employees. To correct this difficulty, many plants operate some type of food dispensary, which may be no more than a very simple cafeteria or may be a quite complete dining room service with waiters. There are a multitude of variations which might be employed, depending on the needs, but the plan used must meet the approval of the help and must be within their means. In certain types of operations where a short rest period is taken in midmorning and afternoon, light food and drinks are sometimes dispensed from a traveling cart.

Safety Work Vital

Mills today work on the principle that an ounce of prevention is worth a pound of cure. Every reasonable precaution is taken to guard belts, gears and pulleys in places where it is possible for an operator to get caught. Some machines which have high-speed revolving parts, such as pickers, are arranged so that they can not be started until all covers are closed. There are also many electrical devices which prevent the starting of motors while machines are being cleaned or repaired. Floors, particularly in wet operations, are being made of waterproof, non-skid materials and well drained.

Attention is being given to the design of mending and inspecting tables to enable operatives to do their work more comfortably. Chairs of the proper height and with correct back supports are being introduced in these departments.

With the increase in the size and weight of loom beams, mechanical hoists are being installed to reduce the amount of heavy lifting. In cloth finishing plants, hoists and electric trucks are being used to move the cloth rolls which are ever increasing in size.

In many operations in a cotton mill, uniform and correct conditions of humidity must be maintained. While this is largely a matter of production necessity, it does contribute to the comfort and health of the operatives and the improvement in the running of the cotton makes the work easier.

Air conditioning in its broader sense, meaning the complete control of humidity and temperature all the year, is somewhat too expensive in its installation and operation costs at present to be used by textile plants. Furthermore, for reasonable economy, buildings should be specially built for such systems and the average mill building is not suitable. But in some special places, such as offices or similar rooms, air conditioning can be used to advantage and has economic value as well as comfort.

Ventilation of machines and rooms which produce excessive heat, hot vapors, or objectionable odors, is now accepted practice. It is no longer necessary to have rooms full of dense fog or operatives suffering from hot blasts. By proper enclosure of the machines and an ample supply of fresh air, any otherwise offending room can be made a satisfactory place of employment.

Today, in the well equipped plant, the employee has a well-lighted and ventilated room in which to work, clean, sanitary wash rooms and toilets, rest rooms and first-aid rooms. He is safeguarded against injury, and in case of accident he is given all

Typical mill first-aid room

possible medical care and attention. His physical wants are supplied by lunch rooms in the plant and pure cool water to drink. And even his transportation problem to and from work is simplified by furnishing him with a parking place where his automobile is left while he is at work.

In general the progress which has been made in recent years to add to the comfort and safety of the employees has been welcomed and appreciated by most of them, and is in a measure contributory to the better understanding which exists between employees and management.

THE MILL VILLAGE

Why it exists, what it really is, and what problems it involves

By W. M. McLAURINE
Secretary-Treasurer, American Cotton Manufacturers Association

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IN THE FLUX of the social upheaval, writers and reformers are pouncing upon every conservative or established principle of life in an effort to change it radically and violently—the idea seeming to be that everything needs to be put in a perfect setting in order that progress may not be stopped and that change will effect this.

There are two kinds of changes possible. One is the silent evolutionary growth of progress which meets the needs and abilities of the masses; the other is the revolutionary, erratic change which confuses the masses and destroys ideals and creates fear.

One change is effected by the patient and intelligent student of social economics; the other is effected by the impatient, emotional, unintelligent agitator of an impractical idealism.

The cotton mill village with all its good and evil has come under the scrutiny of these reformers who are endeavoring to portray its awful iniquities as if it had no righteousness in its history. It is bad, so they say, and something must be done about it, so they at once proceed to destroy it without trying to study its values and even without attempting to offer something better in its place.

The following story is an attempt to make an honest record of facts about this phase of industry.

In the first place, most people think there are no villages save in the textile mill communities. Almost every industry of any consequence has some villages. This is particularly true of the coal and iron industries, sawmill industries, and even the large plantations have their villages of tenant farmers. There are villages in every section of the nation. This statement is made not as an argument, but as a means of trying to inform the public that the textile industry is not the only industry using this system and that it is not a distinctly southern textile institution. In fact, it was copied from New England, which copied it from Old England.

Why the Mill Village

There were, and still are, reasons for the textile mill village:

1. Most mills are either in isolated communities or remote from the town or city proper. Burdensome taxes and corrupt politics made this necessary—also lack of real estate development on the part of others.

2. Most textile mill workers, like many other workers, were not able to buy homes, and lack of transportation facilities made it impractical to live far from their jobs.

3. Early mills were built near water power and railroad, and in fact where it seemed most advantageous for them economically.

4. The mills could build and maintain better homes and at a more reasonable rent than the workers could secure otherwise. The employees were freed from rental racketeers, and slum areas.

5. Most people like to live in homogeneous communities. The textile mill in the early days was indoctrinated with the idea of the family unit and this meant a gregarious psychology. The people came from country communities together and moved to mill village communities together.

6. Practically all these workers had no inheritance of home ownership and no psychology of urban concepts.

7. They have desired other things more than homes. They have wanted cars, radios, refrigerators, entertainment, etc.

8. Many of them went from farm to factory and back during the year. This was a common occurrence during the early days. There were no leases to break and no rental problems in their movements.

9. The question of labor turnover in those days was great and mill people were great movers. New mills and "greener fields" were always urging labor turnover. The textile industry was in the travail of being born and nurtured as a tender child.

10. Most of the workers were rural in their philosophy; the lure of the city did not attract them. The mill village comprised a solidified group of rural people who thought and lived much alike.

Without going into a long discussion, no student of economics and sociology will deny the necessity of the mill village in its inception and no one will deny the splendid contribution that it has made in the social and economic life of its people.

Like all human and material efforts, it has not been perfect and there can be found here and there stigmas that blot the beautiful picture. This is life in its consistent operations. There are no perfect plans and no perfect situations. By and large the mill village's contribution to education, health, religion, better appreciation and understanding of life is unquestioned and unchallenged. Its economic contribution is too great to try to describe and, even allowing for its evils, it is decidedly a constructive effort.

But the self-appointed critics say this is a new day. Freedom of thought and action, social consciousness and individual rights must not have any barrier placed in their march. The age of childhood in the industry has passed. Paternalism and dependency are synonymous and the new day abhors both. The mill village must go because it has been outgrown. This is a day of self-determination and self-expression and the village is still feudal in its operations and influence.

For the benefit of those who think that the mill managements hold tenaciously to this village institution, it may shock them to know that the village is as much a problem to the mill as it is to the social reformers.

What the Facts Are

In 1935, Ralph E. Loper & Co. made a survey of 50 typical mill villages in the South, studying village costs and wages.

In the data compiled it was ascertained at that time the total value of the 50 villages was $34,203,736.00 with total normal rents of $24,754.30 per week.

Table at top of next page is quoted from page 9 of this survey.

The net cost to mills for maintaining these 50 mill villages was thus $72,156.83 per week or $3,752,155.16 per year. These figures are sufficient to impress any average person that the village is a financial problem.

TABULATION OF VILLAGE DATA
(50 VILLAGES)

Present value of villages.	$34,203,736.00
Employees housed	37,085
Persons employed	53,462
Houses in villages.....	15,812
Rooms in villages.....	69,027
Normal weekly pay rolls.	$766,724.65
Normal rents received by mills per week (including rents received from stores, boarding houses, etc.)	$24,754.30

WEEKLY EXPENSES TO MILLS AND OTHER DATA

Interest at 6% per annum..	$39,465.85
Depreciation	17,060.88
Maintenance, Administration, etc.	33,899.69*
Insurance and taxes.....	6,484.71
Total village expense.....	$96,911.13
Less total actual normal rent credits.....	24,754.30
Net cost to mills.....	$72,156.83
Cost to mill per employee housed	1.946
Cost to mill per person employed	1.351
Cost to mill per room.....	1.045
Cost to mill per house.....	4.563
Average rooms per employee housed	1.86

*Note: Includes cost to mills for Welfare, Medical Services, Nursing Services, Repairs, Water, Light, etc.

It is also indicative of the fact that the mills are taking excellent physical and social care of their people. A complete breakdown of this cost item would reveal the fact that mill people enjoy all of the progressive comforts of living and developing that people in other sections enjoy and often far more advantages.

Through the welfare work of the village plan, people have advanced; through education and socialization, through good roads and cars, through science and invention, the village is no longer the necessity that it once was and yet its existence and its heritage make it a difficult appendage to remove.

These textile workers in their social and economic philosophies are no different from other people now. They live in progressive communities with schools and sidewalks and churches and hospitals and electricity and water and waterworks and homes fitted with modern appliances. The village has kept pace with progress. Home owning, as a policy, has become more expensive and less desirable for every one. Taxes and types of houses outside of villages do not lure many away—and yet, if every mill manager could awake some morning and find that his village, with all of its problems, had been solved and that all of his people were in a better and more wholesome environment, a burden, whose weight no reformer can know, would be lifted from his shoulders. And yet the need for the village abides.

Even the Government with all its money and idealism has been unable to make rural rehabilitation a success. It has not even been able to make it attractive, much less an economic possibility. Nor has it, in any of its plans and purposes, been able to leave off the dictatorial hands of certain "musts and must nots," more objectionable than the control of any textile mill village.

Attempts Toward Solution

Textile managers are fully aware of the problems of the mill village. A few mills, as an experiment, have sold their villages and now have no control or care of them. Others are trying to decentralize them and help their people move to the country and own their own homes. During the last few years there have been but few mill houses built and those have been of a different type. They have been built away from the mill on acreage lots so that the people who live in them may be induced to buy them, and still the rental is so cheap that it would be more expensive to own than to rent.

One of our psychologists has remarked that it takes 20 years for a new idea to become popular and effective. It may be that in the next two decades, the problem of the mill village will be solved. It is too important in its population, too important in its social and economic implications, to be solved hastily or by some simple edict. Its dissolution, if ever, must be carefuly developed.

In the meantime, the mill managers are studying the problem; the people who live in the villages are studying the problem, and these are the only two groups which have any background of experience sufficient to give an intelligent answer.

Evolutionary movements are always safest. Revolutionary movements are most dangerous. If the public could think soberly and intelligently and not emotionally about many of the problems now demanding solution, it would act very differently.

Society moves by constantly adjusting itself to progress. Society is large and cumbersome; it moves and thinks slowly; but it moves. At the seminar, where this social question of the next move in village life is being discussed, are the men who direct and the men who live in these environments. They are studying diligently and faithfully. The largest problem of life, industrial relations, is involved in this question. It must be solved and it will be solved —not by some legal mandate, not by some wild-eyed theorist, but by employer and employee in mutual confidence, agreeing upon whatever adjustment may be necessary.

It is more than likely that the change will be so gradual that it will be unnoticed save by those who are fully informed of its progress. It is also likely that some remnant of the village will always be necessary. It may be that the village will always remain but under a changed social set-up. Mill managers are practical-minded and social-minded in addition to their evident economic attitudes.

"No one will deny the splendid contribution that the mill village has made in the social and economic life of its people"

Courtesy Martha Mills

View in Victor-Monaghan Co's. mill store at Greer, S. C. Prices are plainly marked

THE MILL STORE

Is it a menace or a blessing?

By WILLIAM P. JACOBS

Secretary-Treasurer, Cotton Manufacturers Association of South Carolina

BACK IN THE 18th century, the South enjoyed an agricultural distinction to the exclusion of practically all other interests. The production of cloth in those days was based on the cottage weaving system, for most plantations had their weaving sheds where homespuns were produced. Somewhere between 1790 and 1810, apparently, first efforts at mass production of textiles in that section began. However, even then, the process could hardly have been dignified by the name of industry.

After the war between the States came reconstruction and despair, and following that a very slow process of growth of an embryo industry. It was late in the 19th century that the development of this industry began in earnest. There grew up a succession of small communities that could hardly be called towns or cities; in no cases were they adequately served by public utilities. As each mill was built, the pioneer manufacturers were forced virtually to build a little city around it. There were streets to be built, wells to be dug, and later, water, light and sewer systems to be installed. There was the necessity of building a church and a school.

But the community necessities did not stop there. The mercantile services were totally inadequate. In many instances the mills were built miles away from the nearest store. It was essential, therefore, for the mills to encourage some merchant to establish a store in the community, or to do it themselves.

Thus the mill store was born—born of economic necessity—the same parent which gave birth to many of our great national developments.

Occasionally a mill could be built near an established community, and thus it was that in some instances the mill store was not developed. But such cases were rare.

Financial Advances Necessary

The same economic necessity required yet another type of service on the part of the textile mill. Most of the workers, having come down from the hills into a new life, were unaccustomed to a cash income and had to learn as adults the lessons of thrift and providence which the youth of today are taught. Consequently someone was forced to finance them by supplying their daily necessities, and that responsibility naturally fell upon their employer. For many years, therefore, the worker—because of his own lack of thrift and because of his necessity—was allowed to hypothecate his wages through advances from the mill office.

The mill store grew in scope as the needs of its constituents broadened. In some cases, independent merchants entered the field in competition with the mill store. In many instances, the manufacturers, finding the independents trustworthy, turned over to them the mercantile responsibility of the community. In other instances, no adequate substitute has yet been found and the mill store still exists as an economic necessity, particularly in isolated regions.

This must be emphasized: The improvident types of people who manned the first cotton mills could never have lived without the credit facilities of such stores, or the personal financing afforded them by the mills.

They have been slow in outgrowing the necessity of both these functions. They have partially done so, and the cotton mill store has emerged from that era of economic necessity into one of economic desirability.

Early in this century, people began to think of such services not as economic necessities but as profitable activities for the mill executives and the mill store managers. They began to suspect hidden profits and treasures—and accompanying this suspicion was the accusation of paternalism.

Now anyone who has been close to this particular field knows that it was not the desire for profit that developed the mill store, and not the desire to control the life of the in-

dividual that impelled the manufacturer to suffer the tremendous annoyance incident to small loans to workers. The public, however, misunderstood and the mill executive was therefore delighted to have the opportunity to set such suspicion at rest, and relieve himself of this annoying responsibility by refusing to make further advances to his workers through the mill office. That became general policy. The step, however, forced a new burden upon the mill store.

The Store Carries the Bag

Commercial banks were unable to make loans without collateral—and the workers as a rule had none. There were loan sharks, but the rates of interest were of course exorbitant. As a consequence, the financial load fell automatically upon the mill store—and where there was no mill store, it fell upon the independent storekeeper in that area. It grew out of the demand on the part of the worker for an advance of provisions, and the only security he could give to justify a credit was authority to deduct from his wage. The system of wage deductions therefore sprang up, as an economic necessity, and as a convenience to the worker, and did not originate through a desire for profit on the part of those advancing the merchandise.

Then along came periods of adversity. There was sickness. A new child was born. And as the mill stores did not supply cows, new-born babies or caskets, the policy of advancing merchandise automatically grew into a policy of advancing money. This has grown to a point where not only the funds for doctors and hospital bills, cows and new-born babies are advanced by the storekeeper, but also funds for other large purchases—sometimes including automobiles, radios, refrigerators, etc.

Then would come periods of depression. The mill would have to shut down because of lack of orders. The workers had to have food. Again the load fell on the mill store. They advanced funds against future wages sometimes for weeks in a row. There are instances in the South in which many a cotton mill store has had tied up in advanced funds well over $100,000 at a time, during a period of shut-down.

The mill stores have automatically developed into the Santa Claus of the improvident worker.

Out of this condition grew the scrip system. Some call it the loony system or the coupon system. Scrip—either metal disc or paper coupon—took the place of the I. O. U. or other evidence of indebtedness. It was so much in demand that workers secretly would come into the store, buy $5.00 or $10 worth of scrip on credit, and use it for their purchases of the necessities and luxuries of life in advance of the collection of their wage.

Of course all economic systems have their dangers and their short-comings—and this mill store system and the scrip system are no exceptions. There sprang up shrewd citizens within the industrial villages—usually workers themselves — who were provident enough, or fortunate enough, to save up some of their earnings. They found the most remunerative investment for this surplus was in loans to fellow workers. First, they charged exorbitant rates. Later, as this process was outlawed and to an extent curbed, they followed the ingenious policy of buying scrip from the workers. The worker would go to the store and secure a book of scrip on credit. Desiring cash for some extravagance, or even necessity, he would seek the discount man (who incidentally was not connected with the store) and would sell his scrip at a discount—sometimes receiving as low as 80% of the face value, depending upon how dire was his need of cash.

In South Carolina the discounting of scrip was absolutely prohibited by law. The mill stores themselves have vigorously prosecuted all instances of scrip discounting which they have been able to locate. In spite of this attitude, however, there are still evidences of malpractice and misdirection. Nevertheless, the committee appointed by President Roosevelt during NRA days to study this subject reported no evidence of the discounting of scrip by the store managers or by the stores themselves. The process is invariably handled by some outside shyster.

Findings of President's Committee

Referring to the report of this President's special committee, their conclusions and recommendations were as follows: (1) Workers be assured of receiving reasonable proportion of wages in cash each pay day; (2) pay period be limited to one week and pay hold-back to a maximum of one week; (3) employers of labor be prohibited from requiring employees to trade at the company store; (4) payment of wages in any form other than lawful or par checks be prohibited.

All these recommendations are laudable and all have been in force in the southern textile industry for many years with the exception of the one referring to a worker receiving a reasonable proportion of his wage in cash. The mills would welcome such a provision. The ones who would be inconvenienced by it would be the workers, for the act of assignment of wage in advance is a voluntary act on the part of the worker himself and one which the mills discourage as much as possible.

Among the conclusions of the committee was this: It found but few cases of direct or indirect pressure being exerted on the employees to trade at the company store. It also found the company stores sell goods and render services equal in quality with those offered by the independents.

The President's committee gave the textile mill stores comparatively a clean bill of health. They recognized the economic necessity for such stores in some areas and cleared them of all accusations having to do with the forcing of trading and the discounting of scrip.

The mill store has been on the spot for over 75 years. It has been forced by necessity to clean house. As a consequence, its practices are the most honorable and they are most solicitous of the interests of their clients. They have to be to hold their position in a highly competitive field. They are doing so by introduction of modern merchandising methods, better display, prominent posting of prices, unusual services in delivery of small items as well as large, unusually long terms of credit, operation of sanitary butcher shops and of splendid drug departments, and in many other ways.

The Field Is Highly Competitive

The mill store is now sinking or swimming in a highly competitive commercial field. Where it does not serve, it sinks—and many have closed their doors over the past quarter century. Some new ones, under expert management, have been opened and have prospered because they have met competition. That is the first conclusion one reaches in studying this problem. The second is that the practice of extending unusual credit to the worker is still essential to his welfare.

It is logical to conclude, therefore, that if the cotton mill store is inimical to public interest and if the scrip system is also injurious, and if in spite of all evidence to the contrary it is decreed that the mill store and scrip should be eliminated, then society must, in fairness to the worker, organize and operate some new form of merchandising service, some new system of credit whereby the worker may hypothecate his wage—the only asset that he has.

If the reformers would tear out this agency, it behooves them to replace that which they destroy by something better. It is worthy of note that the mill store is exactly that—the better thing, which has evolved from generations of economic experience.

NO SYSTEM, BUT . . .

Kendall personnel machinery kept as "unimportant" as possible

IF ANYONE is looking for a spectacular system of industrial relations, Kendall Mills is just the place *not* to go to. In fact, there really isn't any system there at all. What the company has is a desire—and a will—to build up a set of conditions which in themselves automatically produce sound employer-employee relations.

This attitude was strikingly expressed for us by the official who has general supervision over personnel policies for the company as a whole. "Actually," he said, "I want the personnel manager or the personnel department to amount to just as little as possible." That from the head personnel man who incidentally has been engaged in that sort of work all his life! What he meant was that they want results with as little machinery as possible.

Obviously, such a policy requires a lot of hard spade work at the beginning. And the main thing which always characterizes the Kendall organization in whatever job it undertakes is this: securing the best key personnel available. This is reflected dramatically by the character of the men who have been developed as managers, assistant managers, etc., at the different plants, and in the type of staff men who are now shaping industrial relations policies.

But even with such an organization built up, there is no haste in formulating policies. It is felt necessary to educate the mill managers and supervisory force in what might be called the pitfalls of labor relations: that is, making them aware of the day-by-day incidents which may accumulate and build up into major differences of opinion.

In passing this knowledge down the line, there is absolutely no rigidity of method. Each mill manager is free to adapt the policies to the needs of his particular situation.

One of the most interesting experiments at Kendall has been the annual "labor audit" taken at each plant. The purpose is to take stock each year of the kind of people engaged, and to try to classify them in groups so that rewards may be worked out.

The major classifications utilized are: 1. Ready for promotion; 2. Material for promotion; 3. Average workers; 4. Below average; 5. Incompetent.

The mill recently took its second annual "labor audit" and feels that in this way it is building up not only an intelligent knowledge of its own personnel but also a real basis for promotion.

Summing up, the Kendall theory is this: First, the management tries to give the best working conditions, and the best possible wages. Then, it tries to give the best living conditions. Then, it tries to pass education and knowledge of the company down the line.

No Kendall story is complete without reference to its village policies. A thorough program of rehabilitation is under way in each of the southern mills. One of Kendall's northern mills, incidentally, is noteworthy for the beauty and interest of its village. Practically all the houses at Slatersville, R. I., were built between 1800 and 1840, and many are rare gems of colonial architecture.

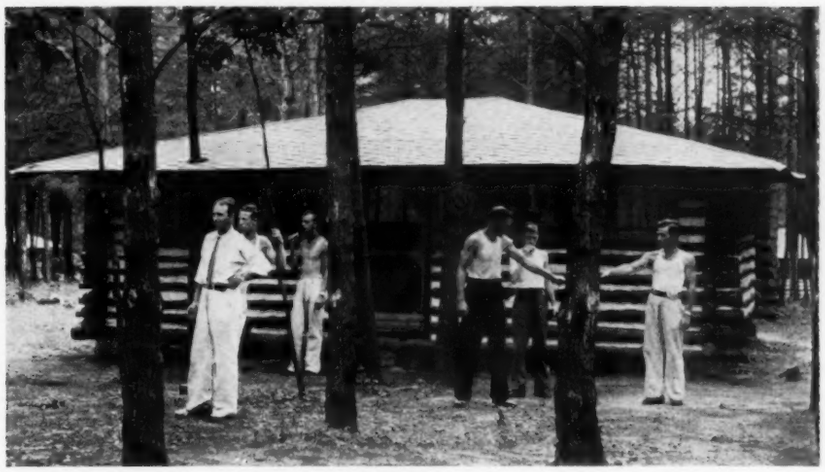
Some of the finest Colonial architecture in New England can be found in the village at Slatersville. The above are houses of executives

Operatives at Slatersville live in both apartment buildings and individual houses. Some of the houses are over 100 years old and have been kept in a perfect state of repair

EDUCATION, HOUSING

Feature Marshall Field industrial relations

ISOLATING the keynote of industrial relations at Marshall Field & Co., Manufacturing Division, Spray, N. C., depends on whether one is interested in long-time trends or in spot news. If the former, there is no question that education and cooperation are the fundamental story. If the



Relaxation at the Marshall Field camp is enjoyed by employees at no cost

latter, the housing situation is probably topmost.

Backbone of the educational and cooperative plan at Spray is the Carolina Cooperative Council which is one of the oldest and most successful foremen-keymen groups in the industry. Organized in 1920, its purpose is to promote the exchange of ideas and to further the general welfare of everyone connected with the company. Nor does its influence stop with the department heads and keymen represented in the Council. There is a definite follow-through down the line. Also, there has been formed recently a Junior Carolina Council with practically the same ideals and purposes.

General education in the Marshall Field community includes: foremen conferences; evening vocational classes, held regularly since 1919 under the supervision of the State Department of Industrial Education; a "learner" plan which allows ambitious young people in the mills to learn better jobs under experienced workers; and a "comer" group composed of young college men who wish to become better acquainted with the broad policies and practices of the company. Within the last year a vocational textile school, attended by many mill workers, has begun operation as a department of the local high school.

The new housing plan at Marshall Field calls for making company-owned houses into real homes through an enlarged plan of village improvement and beautification. Rents were recently increased from 25c to 50c per room a week, the additional sum being expended to bring about better kept houses and streets. There is no regular homestead plan, but operatives are encouraged to own their homes. The mills are not attempting to dispose of their villages, but occasionally do sell one of their houses to an employee.

In matters of general interest to

Home owned and occupied by C. A. Light, Spray, N. C., weaver at woolen mill for 24 years

employees the management believes in direct approach and complete openness. For example, some time ago the general manager in two days made 27 talks to as many different groups of employees, reaching personally every employee in all the mills. This procedure is sometimes supplemented with a personal letter to each worker in order to put facts concerning the company and its policies into his hands.

Employees themselves play a big part in carrying on various phases of welfare work. Hospitalization is taken care of by a Mutual Aid Association plan which is a pioneer of its kind. For 25c a week a member and his dependents may receive up to $200 against surgical or hospital expenses, as well as other benefits. Group insurance, covering life, accident and health, is available, claims being adjusted and paid by a local representative of the personnel department. Community nursing services are available to employees at no cost to them. First aid stations are provided in all departments of the mills.

Credit to employees is never extended by the mills except occasionally in cases of emergency. Rent, however, is deferred during periods of curtailment to be taken out later in convenient installments. Federal credit-union banks are available for employees who wish to use their facilities. These are operated by the employees. There are no company stores in the Marshall Field villages.

Employment is handled through a central employment office which cooperates with the operating executives in trying to place persons in proper jobs. Applicants considered for employment are required to take a physical examination.

Social, recreational and various religious activities are under the direction of four Y. M. C. A.'s. A fine summer camp with facilities free to employees and the public is operated by these institutions.

The foregoing description obviously highlights only a few of the more important factors entering into the industrial relations picture at Marshall Field. Volumes could be devoted to the ramifications of any one phase. The story would not be complete without mentioning the part played in the development of the program by the present general manager of the manufacturing division, Luther H. Hodges. He is widely known as one of the most social-minded executives in the industry. He has always taken a keen interest in human relationships and helped in the development of the Marshall Field personnel program. Needless to say, his personality played a big part in the development of the industrial relations activities of the company all along the way.

DEVELOPING KEY MEN

Into individual "personnel departments" is aim of Pepperell Mfg. Co.

"DEVELOPMENT of a group of key men, each of whom is a personnel department within himself," is the aim of Pepperell Mfg. Co., Biddeford, Me. The management wishes these men to be so trained that they actually represent the feeling of the company and not of the individual.

With this aim in mind, naturally a great deal of emphasis is put on the training of foremen and second hands.

These two boys are now men. They have been working 35 years for Pepperell

This is partly done through the medium of a foreman's club which meets once a month. The program usually consists of round-table discussions of management problems, supplemented with outside speakers who lecture on merchandising, machinery, personnel, etc. In addition, the members are encouraged to take correspondence courses in management. Last fall, the club sent two delegates to the National Foremen's Convention at Detroit.

Before any major change in general policies is made, the question is taken up with the supervisors to be sure they understand the situation thoroughly and are in agreement concerning the advisability of the move. The mill does not believe in letting a supervisor pass an order to the employee "because the management wants this done." Such a procedure is not only negative, but creates a definite doubt in the worker's mind.

Close cooperation between management and the supervisors at Pepperell has resulted in a situation whereby the employee is almost sure to be correctly informed as to the mill's position in all matters of policy. However, there is a double check on this in the form of a local publication, *The Pepperell Sheet*, which is published for the workers. Occasionally the agent borrows a page in this paper to convey a simple message or explanation to the people. The paper otherwise is devoted to personal news and pictures of employees and other matters of interest.

Pepperell does not have a formal personnel department as it believes in a policy of flexibility in employee relations. However, it is not prejudiced against the idea and would develop a department should the need be felt. One of the reasons that a regular personnel department is unnecessary at Pepperell is due to the fact that the mill owns no village. An important part of the welfare work in the village is handled by a French society to which many of the employees belong. Further, the workers are encouraged to confer with their overseers regarding personal problems.

Employees at Pepperell have access to a first-aid hospital, nursing service, voluntary group life insurance plan, and a social and athletic hall (which townspeople can also use). The mill is contemplating organization of a vocational school which would include evening classes.

An interesting factor in the industrial relations at Biddeford is the fact that the agent formerly had some experience in one of the southern plants of the company. In his opinion there is no essential difference in attitude and efficiency of mill employees, North and South. "Fairness and commonsense management are recognized by workers the world over," is his belief.

Pepperell has two large plants in the South. The situation there is slightly different due to the necessity of maintaining company villages, but the general plan of employee relations is the same—that is, the agent handles the local situation as he sees fit. The chief difference is that geographic isolation puts it up to the mill to supply facilities for education, recreation, and physical well-being which the northern municipality furnishes irrespective of the mill.

THREE GENERATIONS

Of ownership-management stress team work at Chatham

PERSONAL management for three generations by the owners of Chatham Mfg. Co., Winston-Salem, N. C., has resulted in a closely-knit organization of which every employee feels he is a real part. In fact, the spirit among the workers is very similar to that found in a school or college where everyone is pulling for the team. Part of this is due to the fact that the president never lets a week pass without walking through the mill at least twice and chatting with the workers at random. He has been doing this for years, as did his father and grandfather before him, and consequently knows a large percentage of the 2,100 employees by their first names. Other executives make a point of being equally close to the man in the mill.

Thurmond Chatham, the president, is a person of wide interests who looks on his job as an interesting game which should be played with the same enthusiasm he puts into his many hobbies. And it is only natural that this enthusiasm would be reflected in his organization all the way down the line.

One of Mr. Chatham's pet ideas is that a person should live in the country to get the most out of life. [He is an enthusiastic farmer and owns one of the finest Guernsey herds in the U. S.] Consequently, over 70% of Chatham employees live on nearby farms, and there has not been a house built in the village since 1925. In fact, the village is a very minor part of the mill properties and is being gradually disposed of as the people move out.

Another Chatham theory is that wages should be as high as possible—and the rate there is among the highest in the entire industry. Furthermore, three special bonuses were paid workers during the year just passed.

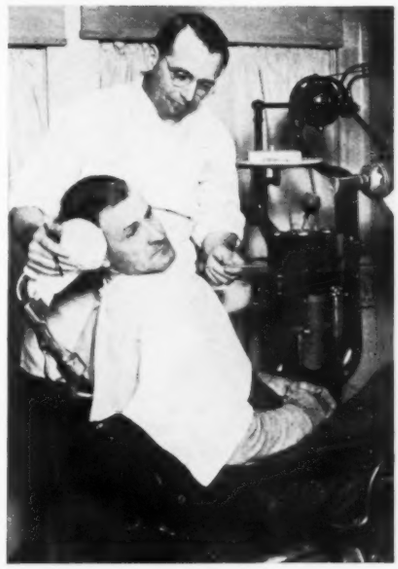
Education of employees is stressed. In addition to the regular school systems, there is a vocational school which has been using the mill as a laboratory for the last eight years. A number of the instructors are Chatham overseers; and Mr. Chatham, himself, on occasions teaches a class in general economics or salesmanship. Young people are encouraged to go to college, and today the mill is helping 15 or 20 secure an education. In addition to direct assistance, which is given on a personal basis, the mill furnishes these boys and girls work during summer vacations. It even finds work for them during the short vacation periods, such as Christmas, in order that they may earn "spending money."

Very little personal assistance is required by the average Chatham employee, and the mill has no set rule regarding credit. However, in an emergency credit is sometimes extended on a personal basis. This may be done by almost any of the executives, since the personal history of nearly every employee is known to them. Most illnesses are cared for under a voluntary group-insurance plan, which includes hos-

pitalization at Elkin. (Winston-Salem employees use city hospital.) Over 96% of the employees participate in the plan. There are first-aid facilities at all the mills, and nursing services at Elkin.

As most of the employees live out of the village, community activities are not as important here as at some other mills. Emphasis is placed on athletics, and there is a director at each mill. Also, there is a woman who directs girls' club work and social activities. Every two weeks, a newspaper is published for the employees which is largely filled with personal news items.

Each plant has a central employment bureau to select workers who will fit into the Chatham picture.



Availing himself of the dental facilities of the mills' medical department, is G. T. Sims, who operates a picker at Avondale

HUMAN SIDE OF INDUSTRY

Describes employee relations at Avondale Mills

THE "Human Side of Industry" is far more than a mere slogan adopted by Avondale Mills of Alabama. It is the basic philosophy of management which the Comer family has continued to work toward since this group of cotton mills was founded 40 years ago by the late Governor Braxton Bragg Comer. It simply means that real efforts are being made to give every employee an opportunity to improve his life and position. And a personal visit to Avondale will show that these communities are taking advantage of this opportunity.

Avondale headquarters are at the Sylacauga Division located about 45 miles southeast of Birmingham, in the town of Mignon, adjacent to Sylacauga. Mignon is an incorporated village with a mayor and board of aldermen elected by the inhabitants. The mayor happens to be master mechanic at the mill, and his aldermen include a winder, a pipe-fitter, an overseer of spinning, and other mill workers. Commercial and community buildings, such as theatre, hotel, schools, clubs, etc., were built by the mill, but are operated by the employees apart from mill management. An outstanding building is the new $150,000 B. B. Comer Memorial School built recently by the mill with the aid of a 45% PWA grant. It houses 12 grades and a kindergarten, and is part of the County system.

Avondale Mills has no central employment bureau or formal personnel department at any of its plants. Employment and personnel problems are handled by the supervisory force of each plant. New help is always selected from the village people as long as surplus labor is available, and promotions are usually from the ranks.

Young people with exceptional talent or ability in specific directions are encouraged by the mill to fit themselves for vocations other than textile work. For example, practically all of the stenographers in the mill office are former machine operators who received secretarial training at the local high school. Many have made teaching a profession. One young woman at Sylacauga who used to work in the mill became a beautician, and today has her own beauty shop in part of a building which she rents from the mill. There are similar instances in other plants.

The children of Avondale employees have available many facilities for developing healthy minds and bodies. In addition to regular school activities, there are all types of club work, athletics, music, books, church, Sunday School, travel, style shows, parties, and other cultural and social activities. Adults also take part in many of them. All organizations are self-supporting, and membership is entirely voluntary.

Everyone recognizes that recreation is the tonic of work, and today there are available to employees and their families three recreational camps—one in the mountains, one on the river, and one on the seashore. Each employee has an opportunity to spend at least five days away from his job in attendance at one of these camps if he wishes, and most of them do so. The only cost of attending is a low charge for meals.

While cultural and recreational activities are an important part of the workers' lives, care of health is even more vital. The medical department of Avondale Mills operates a hospital at Sylacauga approved by the

(*Continued on page 98*)

Representative of the family units at Avondale is that of W. T. Bush, box-loom weaver (center). His daughter (leaning on bench), Mrs. Bloise Zeigler, operates a warper

The main building of Parker High School, Greenville, S. C., attended almost exclusively by industrial persons. Over 98% of the graduates are either employed or in institutions of higher learning

Foremen houses at Slatersville, R. I., some built from a carriage barn over 100 years old

Mr. and Mrs. Frank Sanders, department of Martha Mills,

Mill store at Startex Mills, Tucapau, S. C.

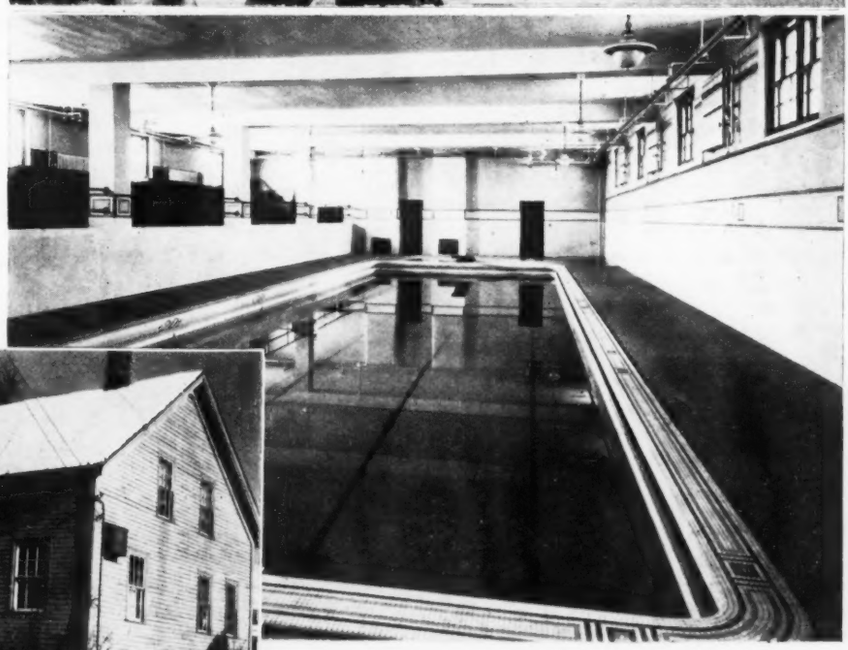
Girls' basketball team at Langdale, Ala. The members, or their families are connected with the West Point Mfg. Co.

The baseball team at Fairfax (Ala.) Mills was 1937 champion of textile teams in Alabama

Religion plays an important part in life of southern textile worker. Shown below is a Sunday afternoon baptising in South Carolina

employees of the spinning are proud parents of twins

Indoor swimming pool for operatives at Pacolet Mfg. Co., New Holland, Ga.



Typical employee house in New England mill village. Company-owned villages in that section, however, are few and far between

American College of Surgeons, a school of nursing for Avondale girls, a day nursery, a clinic for school children, a drug store, and a dental division. During a recent year, this department performed services for employees that, figured at local professional rates, were worth $133,515, but for which they paid only $32,528.30. Even with these low prices the department is self-supporting and does not interfere with privately owned hospitals or private medical practice.

At Mignon and other Avondale villages there are many houses available which are neat, modern and comfortable. Rent is very low, averaging 35c. a room per week which includes water and electric lights. Houses, streets, and general landscaping are maintained by the mill. Many individuals plant and maintain beautiful flower gardens and also vegetable gardens.

While operation of a mill village is necessary at Avondale, as at other southern mills geographically isolated, the management believes that home and land ownership is conducive to a broader and fuller life. With this thought in mind, a financing plan has been developed through which employees can acquire first-class farm land and build their own homes. The employee who wishes to take part in the program buys a piece of land, preferably five acres or more, wherever he likes. When he can show clear title, the mill lends him money at 4% interest with which to build his house. The employee makes all arrangements with private companies for building and for utility connections. The loan is repaid in small payments, amounting to little more than ordinary rent, over a period of years.

To date, 118 families have purchased land and built homes just outside Mignon. Similar programs are being worked out at other Avondale units. At Birmingham, acreage in the outskirts of the city was acquired by the mill and is being resold to employees at a more reasonable figure than they could have bought it independently.

There are stores operated in two of the Avondale villages for the convenience of employees. They sell for cash only, no coupons or credits are used for store purchases. Obviously, there are no payroll deductions for store purchases. The same thing applies to operation of a dairy and chicken farm at Sylacauga. Prices of all goods remain competitive, as there are independent and chain stores within walking distance of the village.

Although the mill itself will not extend credit to an employee except in case of extreme necessity, this does not mean that a person who works at Avondale cannot obtain money to buy a new automobile, radio, or whatever he might need. An Avondale Employee's Credit Union is in existence which enables its members to borrow money at a rate of interest lower than banks charge. It also encourages them to save systematically. All officers and directors are mill operatives.

An interesting feature of Avondale life, which other mills are beginning to adopt, is the annual "Open House" or inspection tour held each year. Invited guests include Government officials, customers, selling-house representatives, bankers, the press, operating executives of the mills, and many other persons. The visitors spend an entire week traveling from one mill to another where they witness special programs.

After visiting Avondale, one leaves with the feeling that the management is deeply sincere in its motto and belief that "the function of industry is to take certain things that grow on the surface of the earth, or buried beneath the surface, and convert them into sizes, shapes, and colors that the public want; and to do that at the lowest possible cost without any exploitation along the route."

GOOD RUNNING WORK

Is No. 1 industrial relations policy at Cone mills

WHEN WE asked Herman Cone, treasurer of Proximity Mfg. Co., Greensboro, N. C., what the keynote of the industrial relations policy of the Cone group of mills was, we received an altogether unexpected answer. "We try to give our employees good running work," he said.

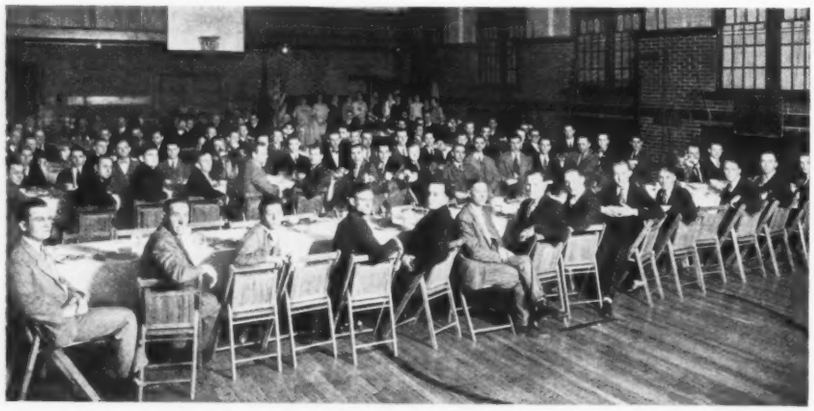
The more one thinks about this answer, the more remarkable it becomes. There in the midst of a so-called paternalistic section, an executive of one of the mills which is often referred to as a paternalistic organization by-passes all the well-known phases of employer-employee relations and isolates the realistic problem of giving a man a good sort of a job.

Furthermore, this is more than just a slogan. For years the Cone group has had under way a consistent program of modernization and improvement. Each year, their plant becomes a more efficient one, and consequently one in which the individual employee has a better sort of a job.

The next fundamental emphasized by Mr. Cone was equally different from what some might expect—and was in fact tied in with his first: that is, keeping the wage scale up to the maximum. The company has had a reputation of always being about around the top, and it still feels that one of the best things it can do for its employees is to give them as good a return for their work as possible.

And so, third on the list of important considerations in industrial relations, comes their community activities. "Most people," Mr. Cone stated, "seem to think these are the important parts of our program here, but the ones I gave you first appeal to us as the most important."

Despite this, the various parts of the Cone community program *are* im-



Members of the night school at Proximity hold a dinner in one of the gymnasiums

portant, and well-known. The two Y.M.C.A.'s, one in the White Oak village and one in the Proximity village, are real and effective community centers. The interesting thing is that these are used more each year. This, too, is surprising to many because it has been felt that, with the social development of the southern mill workers, they would get more and more away from the community activity which the mill offers. The Cone experience has been quite to the contrary.

Another extremely important part of the Cone picture is the personnel department. The thorough way in which this department investigates prospects for employment, even to the extent of interviewing previous employers and general citizens who know the prospects, is quite unusual. The company has been able to trace very definitely an improvement in the caliber of its personnel, due to this careful selection. In addition, the company follows up the individual after he or she leaves its employment, on the theory that he or she is a prospect for re-employment.

Old houses in the Cone villages are being replaced with brick bungalows of this type

This is just a high-light story of Cone industrial relations. It omits such interesting developments as the maintenance of Camp Herman, a summer camp for employees, for example. It omits many other parts of the community effort which make the Cone mills a good place in which to work. But it gives enough, we believe, to reveal the sound basis on which those activities are planned.

EACH PLANT ON ITS OWN

American Woolen Co. encourages ownership psychology

"RUN THIS mill as if you owned it," summarizes instructions given plant managers of American Woolen Co. Beyond that, each manager is on his own to do a good job in both production and industrial relations. Consequently, the numerous units of the company, which employ jointly at times 25,000 persons, have a management psychology which approaches closely that of ownership psychology.

Some years ago American Woolen had a rather elaborate personnel system with a full-time director in charge. This included welfare agencies, organized recreation, a regular program of community activities, group insurance, a pension plan, etc. Also, there were company-owned villages. But during recent years it was decided that many of the old personnel practices as well as the villages represented unnecessary overhead, and should be eliminated.

With this thought in mind, the old system was gradually replaced with a different kind of set-up. Over-all policies today are formulated at headquarters in New York and passed on to plant managers who relay the information through regular channels to the man in the mill. The reverse procedure is carried out when the worker wishes to get an idea across to the management. Employees are encouraged to register all suggestions or complaints in writing.

Regular overseer meetings are held, and there is an organized safety committee. The safety group has been responsible for materially reducing the number of accidents in the mill and for improving working conditions. Ambition is encouraged among the operations by promoting from within the company, and by contributing toward a scholarship fund in the local textile schools.

There are central employment bureaus at most of the plants which perform the routine duties of investigating each applicant and keeping a record of his qualifications. Final decision in employing or discharging is always left to the supervisory staff. Men who apply for work at any of the plants in the vicinity of Lawrence receive a free physical examination at the Wood mill's first-aid hospital. Nurses are on duty at most of the plants at all times, and first-aid equipment is available.

STABLE EMPLOYMENT

Assabet Mills endeavors to smooth out work curve

Since, as indicated in the foregoing article on the over-all industrial relations policy of the American Woolen Co., each unit more or less runs its own show, a brief study of the situation at one of those units is necessary to complete the picture. The following is an account based on a visit to the Assabet Mills of the company at Maynard, Mass.

THE LABOR relations policies of Assabet Mills are based upon the principle of providing as stable employment as possible through fluctuations of market demand, dividing work equitably during slack times and insuring friendly treatment of personnel by management and staff. The mills constitute the principal industry of Maynard, a town of 7,500.

The nucleus force of employees, about 1,500, constitutes the backbone of the personnel. These are nearly all residents of the Maynard-Concord-Acton area and are held at work on a work-dividing basis to the maximum possible degree. The personnel consists of about 50% English-speaking employees, 30% Finns and 20% Russians and Poles. Approximately

20 department heads and about 40 second-hands are on the payroll. As the mill business rises beyond the productive capacity of the nucleus force, additional workers are drawn from the employment department list and outside newspaper advertising is resorted to.

In slack times the spare hands are laid off and the regular employees are rotated so that over a period each person in each department rates his or her share of the work regardless of how little or how much it may be. This policy is pursued rather than to follow the policy of full time for a smaller number of people and no work for the balance. This condition creates a relatively high stability of employment which contributes to good relations between the employees and management. Every consideration possible is given to employees who have dependents.

As a definite management policy, a constant effort is made to have all working conditions as good as possible and as far as possible to see that workers are not penalized for variations in conditions not within their control. The management is always ready to discuss working conditions with employees. There is a minimum of routine in connection with employment. The employment office is accessible and there is a distinct absence of paternalism.

Employment, coming under the personnel manager, involves no medical examination and is not a formidable experience. Overseers and department officials notify the personnel manager of their requirements and these are filled from the list of available men and women or from applicants favorably received. The minimum age is 18 and no sharply defined upper age limit is set. Overseers have full power to reject any applicant and to discharge a worker from their own departments, but before a worker's connection with the mill is severed, the personnel manager considers the situation and if the discharge is not for objectionable conduct, endeavors to locate the employee elsewhere in the mill if possible. About 90% of the employees meet the requirements of the work. The company exerts a friendly degree of patience in trying out employees after acceptance and on some jobs two or three months are allowed before determining whether the employee can meet the requirements or not. Training on the job is largely under the supervision of sympathetic fellow employees and department heads.

The company maintains a works hospital on a 24-hour service basis, with first aid attendance always available and the services of a local physician on call. Safety work is systemmatically and effectively handled by a committee of three overseers headed by the personnel manager. These four make a thorough weekly inspection of the entire plant and recommend changes in the interest of safety. Every three months three other overseers take the place of the former group, thus providing fresh approach to a problem which otherwise might tend to fall into too much of a routine. Great stress is laid upon cleanliness in all parts of the plant with its resulting good effect upon safety and employee morale.

The company at Maynard engages in no employee educational routines, as ample opportunities for these exist in the night schools fostered by the State. There is no company house organ or employee club house or company athletics and no company store or mill village under company aegis is maintained.

It was about two years ago that the company concluded that its relations with employees would be simplified and independence fostered by the sale of some 325 houses in Maynard which American Woolen had owned and rented to employees. At an auction these were purchased by employees at prices ranging from $600 to $3,000 with an average of about $1,100. The majority were single homes of about 6 rooms, substantially built (one group in 1905 and others in 1919-21), all wired for electrical service and equipped with toilets. Small plots of ground were acquired in practically every case. The employee was required to deposit 25% of the sale price and after two years the local banks took over the mortgages. As a result, there has been a distinct increase in employee interest in home owning and maintenance; many of these homes have been improved by the addition of piazzas, oil-heating outfits and other facilities. A greater interest in town affairs from the taxpayer viewpoint has also resulted.

WORKER AS INDIVIDUAL

Is stressed at Berkshire Knitting Mills

THERE ARE six thousand individuals employed at the Berkshire Knitting Mills, in Reading, Pa. Read that sentence with the accent on "individuals," and you have the keynote of Berkshire's attitude toward its workers. Of course, the company's labor relations policy has many phases—it spans a multitude of activities in the field of health, education, recreation, etc.—but no matter which phase is examined, it traces back to the same fundamental, namely, the company's interest in each worker as a separate person.

A sample of the Assabet houses recently sold to employees

All of which, it will be seen at once, is just another form of enlightened self-interest. The self-respecting worker is the best worker. Exit the old idea of the factory employee as an inferior disgruntled person; in place of that the Berkshire worker has been taught to accept a higher concept of service, in which skill, human relations, efficiency and order, are dominant. That stalwart triumvirate of the full-fashioned hosiery industry's pioneer days—Thun, Janssen, Oberlander—

Class in chemistry attended by Berkshire workers

inculcated this precept in their first employees when the mill opened its doors in 1906. Successful management through 30 years has made Berkshire the largest full-fashioned hosiery company in the world; this growth has merely served to strengthen the company's original labor relations policy.

Employee training, for example, has been a major policy at Berkshire for a generation—and it has justified its cost many times over in permanency of personnel. Today as in early years, all Berkshire knitters are Berkshire trained. This training is in charge of mill operatives themselves which keeps it to a strictly practical basis. Sometimes as many as 100 boys are in training at once. The apprenticeship period is four years. For the first nine months or a year, the pupils get elementary instruction on (a) topping (b) straightening needles and (c) knitting machine operation.

This training is given in improvised class quarters located in the various mill buildings wherever the necessary machines may be available. When they have a fair background of practical knowledge, the embyro knitters then combine their further machine practice work with lectures at Wyomissing Polytechnic Institute, a Berkshire organization, where faculty members cover the more advanced phases of knitting machine construction and operation.

The Berkshire employee, an unusually high type, develops not only expertness but genuine pride in craftsmanship as a result of the company's program of training. As a group they are independent and free-thinking which characteristic is evidenced by an organization of employees who deal with their own problems in their own way.

Employee initiative is encouraged by the company's delegation of responsibility to the employees in a number of activities. Large scale social activities such as the annual picnic to Hershey Park, Pa., are conducted solely by employees.

The Yarn Carrier, employee publication issued monthly since 1931, is another example of the attitude of the company in stressing in a dramatic and dignified manner three aspects: (a) the personality of the worker, (b) the perfection of the modern hosiery machine and its operation, (c) the skill in getting the job done. Photographs of employees at work and play are used profusely in the publication to convey the desired impressions.

Behind these highlights is a solid background of service for the workers, built up through many years. To be efficient, the employee must have good food, good medical care, good recreation; these needs are met respectively by: a cafeteria seating 1,200 and three canteens; a dispensary building staffed by four doctors; and an all-year-round social program.

To be sure, this part of the labor relations program is standardized enough. In line with the same thought the company often fills vacancies in sales ranks from mill personnel; knitters train for the selling jobs at Wyomissing Polytechnic Institute.

One Berkshire official summed up the whole labor policy in a phrase when he said: "We encourage them to think of themselves as artisans with individual jobs to do, not just as workers in a mill."

Typical employee at Berkshire operating footer

TO EARN CONFIDENCE

Of its workers is personnel objective at U. S. Rubber Co.'s mills

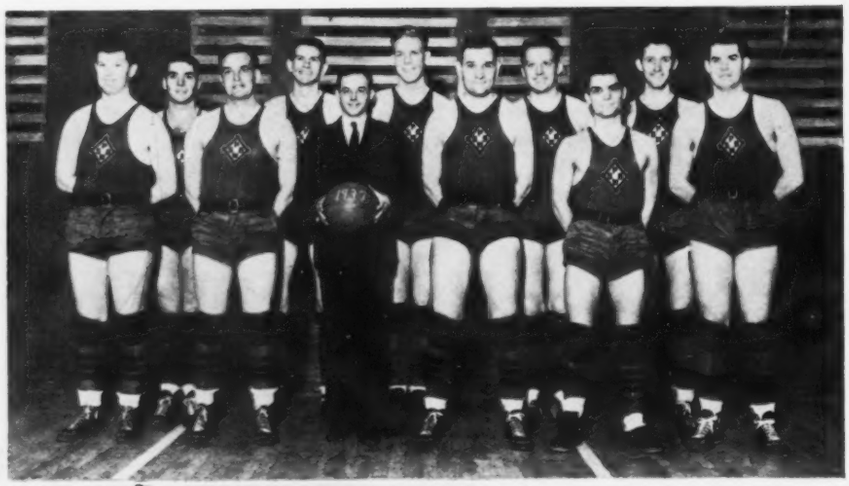
"TO TAKE our employees into our confidence and try to deserve the confidence of our employees."

That statement, made to us at Winnsboro (S.C.) Mills, represents the keynote of industrial relations in the three plants which comprise the Tire Cord Department of the United States Rubber Co. Winnsboro is one of these three mills and is cited here as typical of the entire group.

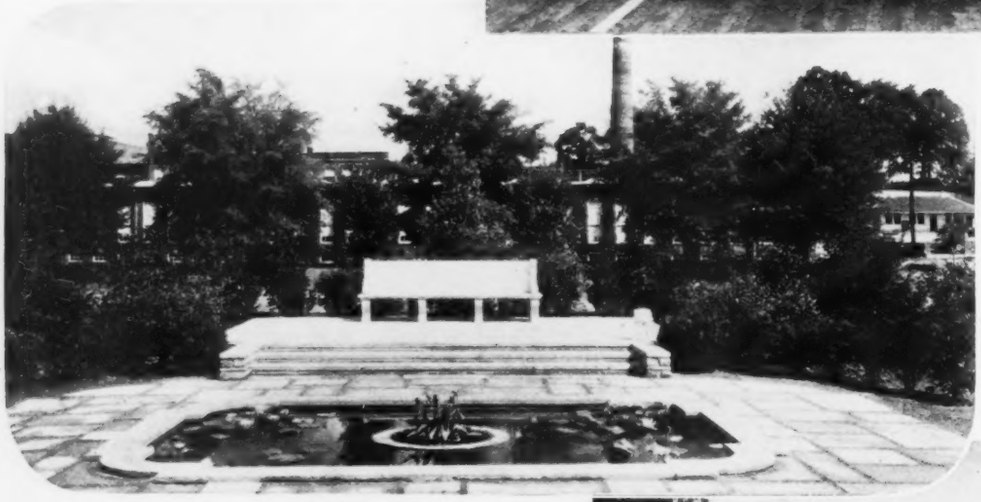
To obtain the confidence of its employees, the management has made a consistent practice of confiding in them operating plans and policies. All problems which concern working conditions, safety and the general welfare of the employees are freely discussed in regular meetings with employees. Increased self-respect among employees and better operating efficiency are definite results.

One of the prerequisites to the successful application of these policies is an intelligent selection of new employees. Toward that end, particular effort is made in the lower school grades. There is a definite vocational training school arrangement. Machines are set up in the school; classes are held in mill arithmetic, office practices, etc.; trips are

(Continued on page 104)

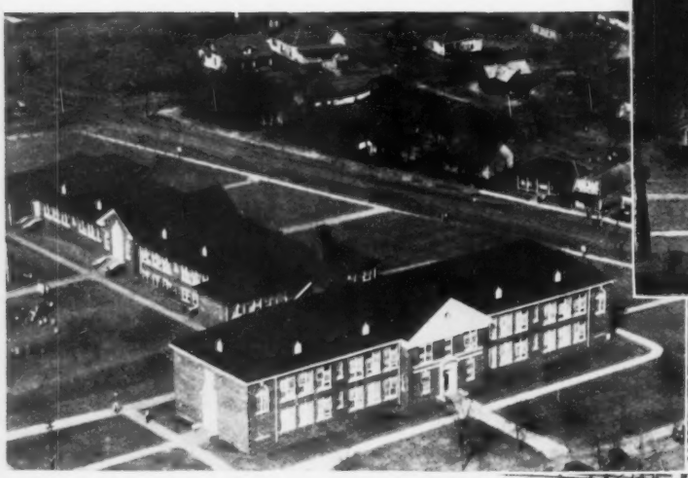


Southern Bleachery & Print Works, Inc., Taylors, S. C., winners in the Class A Boys' Division of the Southern Basketball Tournament held last spring in the Textile Hall at Greenville, S. C. This event is held annually, and last year 83 teams were entered with 634 players from textile mills all over the South

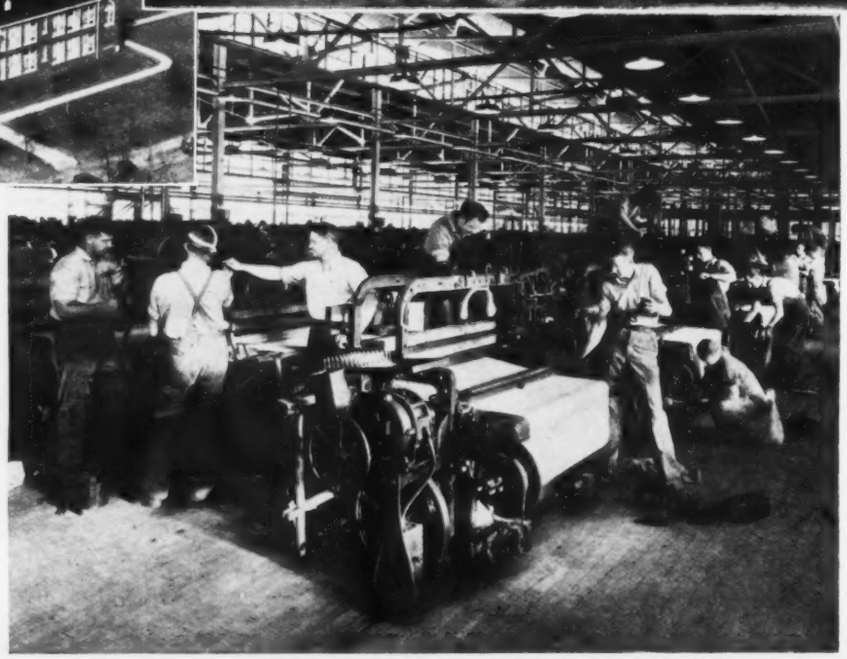


Memorial to Lafayette Lanier erected by the people of the Chattahoochee valley at Langdale. He was founder of the West Point group of mills

A glimpse of part of the village of the Rowan Cotton Mills Co., Salisbury, N. C.



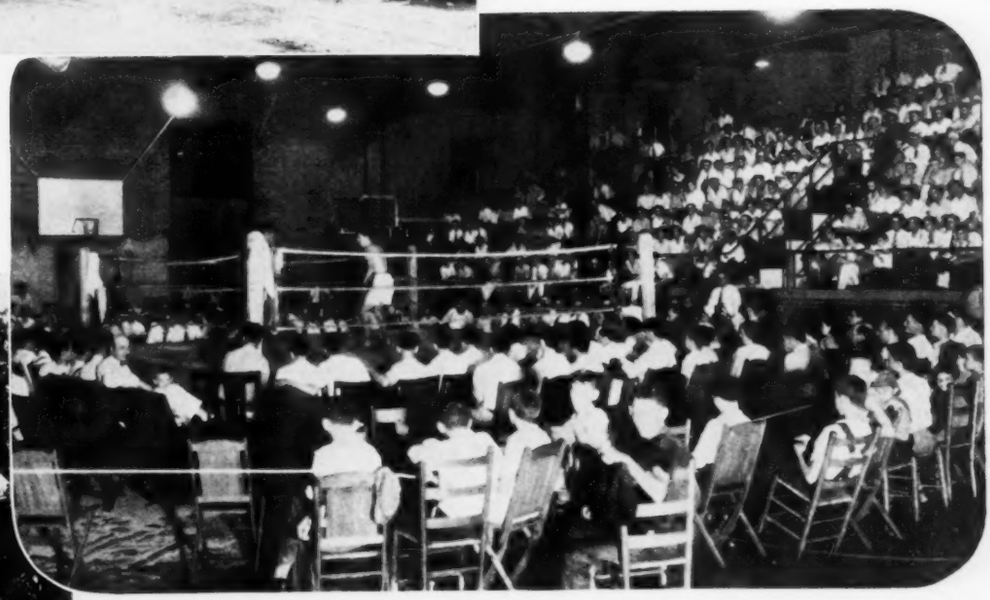
Lanett (Ala.) School of West Point Mfg. Co., with part of village



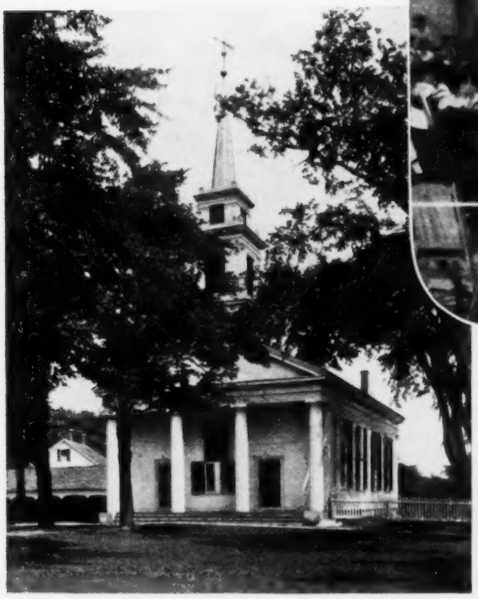
One of the 39 evening vocational groups which held classes in the Parker District last year. These men are studying loom-fixing after hours at Judson Mills No. 2, Greenville, S. C.

Shaded village street at Rocky Mount, N. C.

Employees of Winnsboro (S. C.) Mills enjoy amateur boxing matches in the gymnasium



Church at Slatersville, R. I., attended by many employees of the Kendall Co.



One of the grammar schools at Martha Mills, Silvertown, Ga., and a few of the students

Company houses of Springs Cotton Mills at Fort Mill, S. C. This company now has underway a homestead plan whereby employees live on plots of five to ten acres

arranged for the school children through the mills; overseers in sequence talk to groups of them. This refers specifically to school children, through high school.

It is interesting to note that practically all who were pupils in this vocational training school last year are employees of the mill this year.

Emphasis is placed at this group of mills on industrial relations as a *management* problem, and one which must be given daily attention by the executive management.

Contact with employees by the top management cannot, of necessity, be as frequent and intimate as might be wished. Naturally, the overseers are being trained in this new development of personnel, as they are in constant contact with the employees and it is essential that they be men of integrity, character, and fair dealing, with a sympathetic understanding.

It is felt that getting overseers sold on this whole process of development of personnel is a long slow job. It is necessary to get them to believe in it just as years ago it was necessary to do missionary work in safety. Now most overseers take that for granted, and similarly they are becoming impressed with the need of this other greater job.

Overseers meetings are held once a week, and meetings, in which the section hands and second hands are included, are held once a month. It is made plain, in these meetings, for example, that it is necessary for individual workers to have confidence in their employer—and these men—the second hands for example—are really what the company means to the individual employee. They stand for the company and the way they handle themselves establishes the reputation of the company in the worker's mind.

On this base this group of mills has built up a series of activities all of which help to complete the picture. These include an athletic association, which stands entirely on its own feet; a mutual benefit association; a very excellent safety program; group insurance, including accident and health; retirement and savings funds, etc.

Winnsboro houses are of individual architecture on pleasingly landscaped lots

A very recent development is the homestead plan. The company is starting to provide means to help its employees to build and own their homes. A piece of property has been bought within five miles of Winnsboro. Each house will stand on 10 acres of land so that employees may cultivate this in addition to working in the mill. This is a slow plan to build up but its potential importance is very definitely recognized.

One more thing; the company has periodic ratings of its personnel for use in promotion—and promotion is always carried on within the organization. Consequently a man who starts to work at Winnsboro has the knowledge that, if he makes good, he has a chance for promotion. Also, since this company operates two other cord mills his opportunities for advancement are not limited to the possibilities at Winnsboro only, as men frequently are promoted to better jobs at one of the other mills.

SINCE 1867

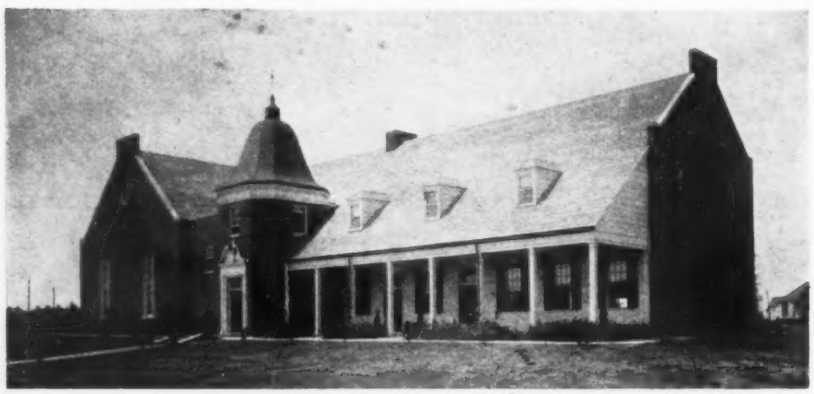
Pacific Mills has been recognized for industrial relations policy

IN 1867 the Paris Exposition awarded a "Gold Medal at the value of 1,000 francs and 9,000 francs gold" to Pacific Mills, Lawrence, Mass., for developing a "spirit of harmony among all those cooperating in the same work" and for "providing for the material, moral and intellectual well-being of the workmen."

There have been many changes in the psychology and method of handling employee relations since 1867, but the basic interest of management in the worker is as great today as it was then.

The original statement presented at the Paris Exposition was recently unearthed by the management of the Worsted Division of Pacific Mills, and affords a unique opportunity to compare working and living conditions of that period with the present.

It was stressed in 1867 that work rooms were comfortable, houses could be secured from the company at one-eighth of a man's weekly wage, and that all workers were required to belong to the "Pacific Mills Relief Society," which took care of them in times of sickness or need. Educa-



Community house at Winnsboro is center of social and recreational activities

tion was encouraged as well as morality, and all were urged to make use of the mill's library of 4,000 volumes.

Naturally most of these paternalistic practices were dropped as they became unnecessary. The mill today has no village, no organized welfare department, and makes no effort to regulate or control the private lives of the employees. However, the management still endeavors to help the employees with their problems if and when requested. This, in general, is handled through the Industrial Relations Department, which functions unobtrusively as a contact between top management and the man in the mill. However, the superintendents' doors and the agent's door are always open to employees who wish to talk with them.

The functions of the Industrial Relations Department are to aid in the placement of employees, supervise matters relating to workmen's compensation, conduct overseers' conferences, to explain the company's policies, encourage education, and other duties of a similar character. The real problem, however, extends beyond these limits and deals with the problems of individual employees.

The mills' fundamental policy is to make working conditions such that the employees may earn as much as possible, through careful planning of work, the use of proper raw materials, the maintenance of equipment, etc. On several occasions the mill has voluntarily reduced the work loads and maintained the same wages.

Some of the most unpleasant situations arise at the time of extensive curtailment, due to lack of work. Whereas the mills' policy is to retain employees who are of greatest value, it is nevertheless a policy also in times of stress to protect as many individuals as possible through the retention of heads of families, in preference to persons who have no family obligations.

Initiative and ambition are encouraged among employees as indicated by the fact that the mill pays tuition of employees who attend the evening classes at the Lowell Textile School, and who complete their courses with satisfactory records.

This, in brief, is the story of the Worsted Division of Pacific Mills. The company has a number of other plants in other sections. No doubt each has as interesting a story.

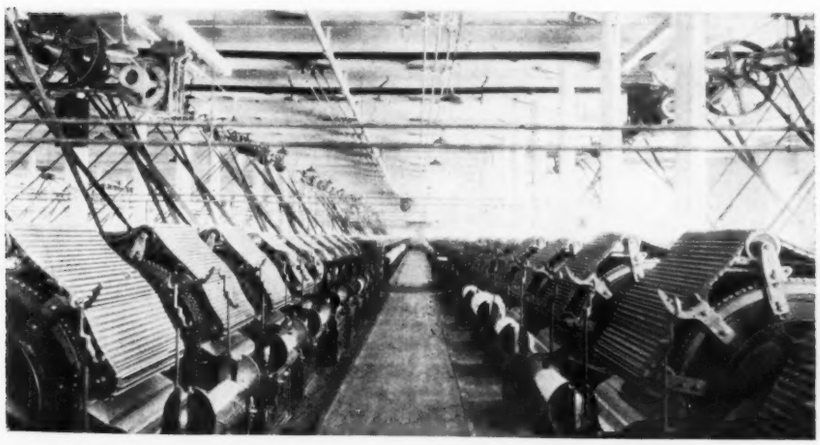
STEADY EMPLOYMENT

At Manville Jenckes gives employees confidence in job

EMPLOYEES OF Manville Jenckes Corp., Manville, R. I., since 1932 have been able to calculate their earnings on a yearly basis instead of by the week. The stability of operation, coupled with a high-wage scale, has built up a spirit of confidence among the workers which is reflected in the entire industrial-relations policy of the company. A policy of absolute frankness, fairness and honesty in dealing with the workers over the years is probably the greatest contributing factor to the excellent relations between workers and management.

The mill has no elaborate personnel system. There is a central employment bureau which investigates and examines applicants for work,

The old agent's house at Manville has been converted into a modern club for the use of employees



Manufacturing rooms at Manville Jenckes Corp. are pleasant to work in

and an employees' Mutual Benefit Association. The last of the village was auctioned off almost a year ago, so there is nothing for the mill to do in that direction.

The Mutual Benefit Association, or MBA, is an organization of workers, key men, and executives. Membership is voluntary, and dues are 50c a month. About 85% of the employees belong. Purpose of the association is to pay sick and death benefits and to serve as a welfare or social agency on occasions. Often needy cases among the workers are cared for by the MBA, and several times a year it sponsors picnics or parties. Members of the organization also cooperate with the em-

ployment department in locating new help when there is a shortage.

The Manville plant is situated in a thickly populated area which has its own civic and community organizations. There is a Community Center near the mill where employees may leave their children, attend home economics classes, take part in athletics, borrow books, etc. This is a self-supporting organization managed by local groups, such as the Red Cross and American Legion. Local relief is usually administered through the center.

A pleasant spot at Manville is the club for salaried employees about which the social and recreational life of the community is focussed. The club house was originally an old agent's house, remodeled and enlarged to resemble a country club in appearance and equipment. Membership is voluntary, and dues are based on individual income.

Regular foremen meetings are held for the purpose of training the operating executives in modern management methods. That this plan is bearing fruit is partially shown in the fact that labor turnover at Manville is quite small. Another contributing factor to stable working conditions is the modern high-speed machinery throughout the mill, which assures the company of meeting competition.

PERSONAL CONTACT

And openness significant in West Point's industrial relations

CLOSE PERSONAL contact between management and employees, coupled with a policy of complete openness regarding plant operations, has built up a remarkable esprit de corps in the plants of West Point (Ga.) Mfg. Co., which would be hard to match anywhere. No major policy of management is ever decided without taking all key men into complete confidence and talking it over. Then, when a decision is reached, word is passed along to those in the ranks, with a full explanation of why it is necessary to adopt such a policy.

An example of how this company takes not only employees into its confidence, but the community as well, is illustrated in something that occurred not long ago. The management thought it might be a good idea to start paying employees by check instead of with cash, due to the advent of social security and its complex bookkeeping. Payment by check would also eliminate the hazard of transporting large sums of money to the various mills for payroll purposes each week. Men in the plants were called in along with all merchants of the towns, and the matter was gone into very carefully, the final conclusion being that the change would be advisable. A full explanation was then made to all employees in each plant through the overseers, and the change was made without the slightest confusion. Some persons might think that this was a lot of fuss to make over a relatively unimportant matter, yet an unexplained and sudden change in the method of paying off might easily cause an awkward situation among employees and local tradesmen.

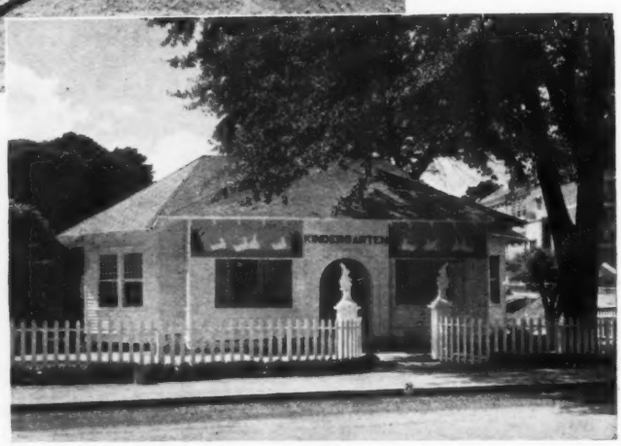
Looking further at the matter of close personal relations among all those connected with West Point Mfg. Co., one has only to walk into the office of the president of the concern to feel that he is in the presence of one who has fundamental understanding of people. George H. Lanier, who heads up this group of mills, and every executive and supervisor associated with him began in the ranks. Consequently, all have a thorough understanding of the employees' problems and find it easy to put themselves in their place in thought and experience.

There seems to be a feeling of genuine affection and friendly understanding among all those connected in any way with this organization. The writer had the pleasure of attending a steak fry recently in the back yard of one of the superintendents. It was given as a reward for an excellent safety record and was attended by the mill carpenters and outside workmen. There was absolutely nothing patronizing about the party in any way, and everyone had a fine time. After the dinner many good stories were swapped and there was impromptu entertainment of various kinds. The superintendent knew every man by his first name. Each community has such parties often for various groups, and they are occasions of real pleasure.

Full responsibility for all matters in each mill and village rests upon the shoulders of the superintendent of that mill. This freedom of action is probably one reason for the remarkably few turnovers in the supervisory personnel and other employees. Replacements and promotions are almost always made from the ranks.

Occasionally units of West Point Mfg. Co., like other mills, are forced to go on short time due to market conditions beyond their control. Such curtailment of operations, however,

Boy and Girl Scout work is an important part of the training of young people who live in West Point communities



Children at West Point are carefully cared for in kindergartens. There is one located in each town

Swimming pools, gymnasiums and athletic fields are available at West Point for those employees who care to use them

is never made in an arbitrary manner, or without giving those affected as much notice as possible, and every effort is made to preserve the interests of each family unit involved.

The educational system in each community where this company has a mill is somewhat unusual. In addition to the regular grammar and high-school courses there are offered to interested boys and girls in the high schools special courses in bookkeeping, typing, business methods, home economics, etc. Another feature is that each mill sponsors courses in textile manufacturing and the plants are used as practical laboratories by the students as they learn to operate machines under actual working conditions. One of the chief aims of the latter courses is to give those students contemplating making textiles their life work an opportunity to see all phases of the industry. In further addition to high school training, the company is sponsoring a plan whereby young men graduates unable to attend college may take a two-year course in advanced textile manufacturing and allied subjects under highly competent instructors.

Most employees at West Point live in company-owned villages composed of neat modern cottages facing shady hard-surfaced streets. These houses rent for the nominal sum of 25c a room per week. Some of them own their own homes.

West Point Mfg. Co. takes the position that "its business is to make cloth" and frowns on any practices which would necessitate payroll deductions. Consequently, all business enterprises and establishments of a commercial nature are operated by private citizens of the community, in no way connected with the company.

The various villages offer ample recreational facilities for young and old, as well as recognized character-development agencies. There are full-time Boy Scout executives, a full-time Girl Scout director, athletic directors, and other persons giving leadership to the various community activities, all of which are supported by the people of the communities, the company participating in proportion.

INDEPENDENT THINKING

And living are encouraged by Martha Mills

INDEPENDENT thinking and pleasant living conditions for employees is the keynote of industrial relations at Martha Mills, Silvertown, Ga. The management is a strong believer in providing the best possible working and living facilities, but beyond that has as little as possible to do with the private lives of the workers. This policy has been in effect at Martha for a great many years, and was arrived at after much study by the management and some outside consultation with employee-relations experts.

To begin with, persons working at Martha Mills are capable of differentiating between what it means to work in a progressive mill and one that is backward. This is due largely to a system of selective employment practiced by the personnel department. This department has been extremely successful, and many other mills have used it as a model upon which to base systems of their own. Its chief function is to "fit the right person into the right job." Features include (1) private interview with employment director, (2) physical examination and individual analysis for job suitability, and (3) interview with foreman who has final word in employing applicant. After the applicant goes to work, the overseer makes a progress report on him from time to time.

The personnel department has developed a definite policy with reference to the young people in the village who wish to work in the mill. Every summer there are conducted tours for these boys and girls which gives them an opportunity to study mill operations as a unit as well as the functions of the different departments. The idea is that this will help the young person make up his mind as to whether or not he wishes to make textiles his life work; it also helps him decide which department he would prefer to work in.

Carrying the idea further, high-school and college boys and girls of proper age are given work at full wages during their vacation periods. This gives them practical experience and helps defray their school expenses. Last year one boy paid an income tax on money thus earned.

Any one who visits Silvertown immediately envies the employees their beautiful village. The houses are of the most modern type and of individual design. Lawns are spacious and landscaped. There is plenty of room at the rear of the houses for vegetable and flower gardens, and many of the residents own domestic animals and pets. All types of hobbies and community activities are encouraged, but are left to the people to organize and handle as they see fit. Educational facilities compare favorably with any in the State.

Employees of Martha Mills are encouraged to own their own homes, but the mill has no policy of financing the construction or purchase. Houses rent from 35 to 60c per room per week depending on type. This includes water and a minimum electrical charge. Rent is waived when the mill goes on short time. There are a number of commercial establishments, such as stores, theaters, etc., operated at Silvertown for the convenience of the workers. These have no connection with the mill beyond the fact that it owns the buildings in which they are located.

The mill extends no direct credit to employees, but encourages them to join the local credit union operated by the workers. This organization paid a 4% dividend in January,

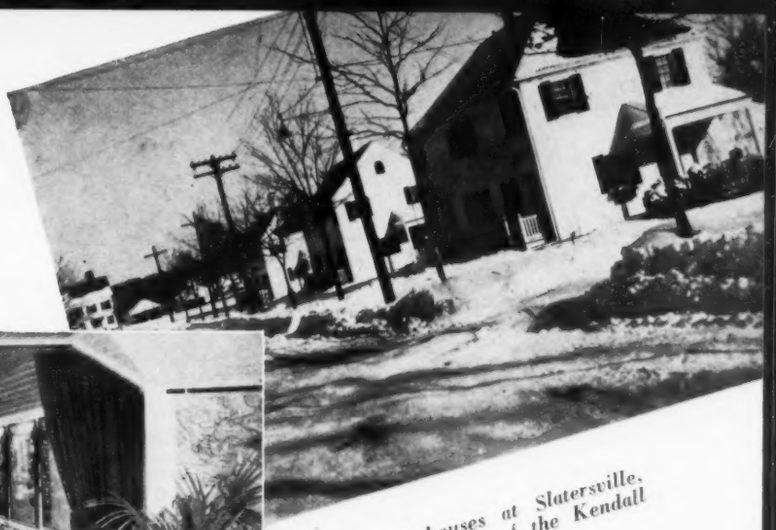
(Continued on page 110)

Weave room at Drayton Mills, Spartanburg, S. C. Note cleanliness and light

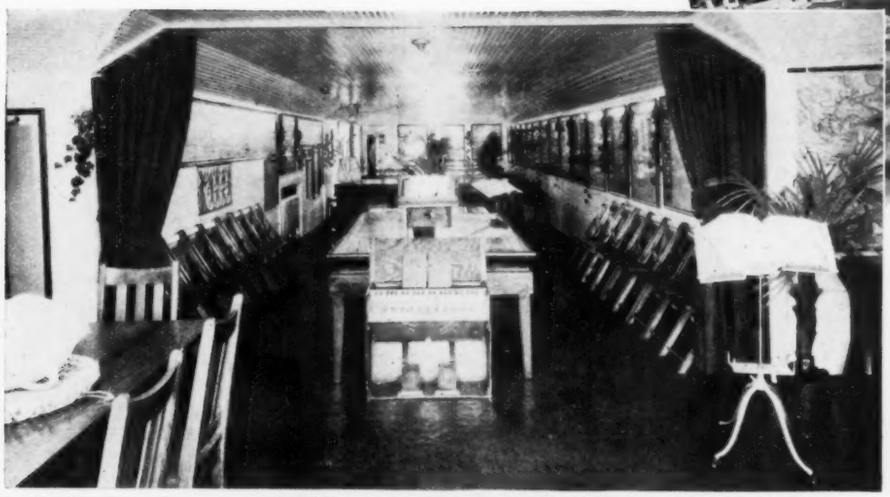
Many mills take pride in the landscaping of their grounds. A fine example of this is Union Bleachery, Greenville, S. C. (at right)

Mr. and Mrs. J. T. Pritchett, machine operators at Martha Mills, Silvertown, Ga. In addition to themselves, there are three sons, three daughters, two sons-in-law, and one daughter-in-law employed by this same mill (below)

Mill village under construction showing architectural details



Overseers' houses at Slatersville, R. I., where one of the Kendall mills is located



Biblical room in the Cone Y. M. C. A. at Greensboro, N. C.

Commissary in plant at Rocky Mount, N. C., which operatives are free to visit

Banquet given by a "Flower Club," composed of members of the night weaving department of Southern Worsted Corp., Greenville, S. C.

(At left) Home of R. P. Finley, employed in the carding department of Martha Mills, prize winner in home improvement contest. (At right) Home of Eugene Oglesbee, card room operative

and distributed over $125,000 in Christmas savings a little earlier.

Martha Mills does not have what is commonly known as a welfare department, but it does have a policy of helping employees in time of sickness or extreme need. Excellent medical services and hospitalization are available in Thomaston, about two miles from Silvertown, and the mill maintains emergency first-aid stations. Work is distributed as equitably as possible in times of curtailment.

A small pocket-sized newspaper, is published for the employees. It serves a real purpose and is eagerly awaited each week by over 3,000 subscribers. Content largely consists of personals, community activities, and photographs of workers in their daily life. Occasionally, the management uses the paper as a means of getting an idea across to all employees. For example, in the issue of Dec. 10, a short article was published by Albert T. Matthews, general manager, in which he analyzed the slump in the motor-car industry, which was later to affect mill operation.

"STAND ON OWN FEET"

Is Firestone's slogan after giving employees the right means

WHEN Firestone came to Gastonia, N. C., three years ago, it started at once on a program of rehabilitation of the mill it took over. With the cooperation of the community and the PWA an ambitious paving program was inaugurated, and with paved and well-drained streets as a basis Firestone painted houses, reroofed them, and built new ones where necessary on the thesis that workers could only be as good as the houses they lived in.

Then, going a step farther to the thought that workers were only able to produce a product in ratio to the type surroundings they worked in, the mill itself was entirely renovated both as to appearance and machinery. The operative personnel was carefully sifted until an element founded on ability was obtained. Then, and then only, the mill started operations.

Today Firestone stands out in the Piedmont section as a mill which leads in industrial relations. Firestone goes on the theory that personal contact between management and worker is the biggest item. The management believes in group meetings, and in all mechanical means for doing recreational work, establishing safety schedules and occupational records, but feels that nothing can supplant personal contact.

The long-view achievement at Firestone Cotton Mills is to make men and women as well as tire fabric at their plant. The management furnishes the means by which their workers can best adjust themselves to living problems but they refuse to solve their problems for them. "Stand on your own feet," is the slogan; "use the means provided here for your benefit but work out your living for yourself."

The means provided consist of wages above the average, a decent community with well ordered civic management, and athletics for the men's leisure time under an athletic supervisor. They have tennis, soft ball, football, basketball, and baseball in season. In the clubrooms they have bowling alleys, pool tables, checker and card tables. The women have sewing, cooking, and reading clubs where they are given the opportunity to develop improved personalities as well as domestic arts.

The Firestone Hobby Fair was a major achievement last year, and was city-wide attended, not just a mill event. It was inaugurated and directed by one of the clubs at the mill, not fostered by the management but carrying its tacit consent.

A park for the children with swings, sandpiles, and wading pool, keeps Firestone youngsters out of the city streets and under a recreational director they develop into actively normal children, not hoodlums.

Another highlight is the annual textile school, under the direction of North Carolina State College. Units obtained in this school may apply on a degree from the college. It is amazing, in attending one of these classes, to note the ambition among the members. One young fellow was studying to be a loom fixer, because that was the best paying job he knew of, and when he saved enough money fixing looms he was going back to the university to take his law degree. He already had two years there, he said with pride. To 1938's mill youth these vocational classes are not just shortcuts to higher pay but avenues to professional careers. They are at-

Firestone Cotton Mills, in the heart of Gastonia, N. C., is surrounded by a modern village. Note section of children's playgrounds in foreground

tended because they are wanted, not because the boss says to.

A splendid camp with best outdoor facilities, including motor boats and cabins, is maintained on Lake James and open the year round for any mill worker who might like to "get away from it all" and do a bit of fishing or boating. It costs the Firestone operative nothing to go there and stay as long as he has the time and inclination.

Firestone works on the theory that if the best facilities for clean living and good morals are provided their workers will take advantage of them, find a better life and give Firestone better service.

MUST FIT COMMUNITY

Is philosophy and aim of Stillwater Worsted

MANY leading industrialists of today are leaning strongly toward decentralization of manufacturing units. The theory is that plants should be large enough to give people living in the immediate vicinity a cash income, and yet not so large as to disrupt existing societies. The ultimate goal is to make industry a contributing, instead of a dominating, factor in any situation in which it may be located.

One of the first textile plants to recognize the desirability of such an arrangement was Stillwater Worsted Mills, and its several plants located in attractive New England and southern villages bear this out. But this development of appropriate units is just one of the many interesting factors entering into Stillwater's industrial relations.

Emphasis is placed on selective employment, character and future adaptability counting more heavily than industrial experience. Also, preference in employment is given to established residents of the community.

Stillwater believes suitable home conditions are of fundamental importance. For employees who do not own their own property, the company provides modern comfortable homes at reasonable rents, maintained in a good state of repair. At Harrisville, R. I., old houses in the village are being improved, and experiments are going forward to determine the advisability of erecting pre-fabricated houses when further expansion is necessary.

Overseers are trained in modern management methods, and workers are not dismissed without thorough investigation of each case. Occasionally, the president of Stillwater makes a personal address to the employees in an effort to explain or make clear some change in general policy. At such times the employees are free to ask questions, and many of them do.

Stillwater firmly believes in high wages, and good working conditions. It is interested in the general welfare of the employee, and will extend credit on an individual basis in cases of illness or emergency. However, no advances are made for any other purpose. There are adequate provisions for taking care of accidents or minor illnesses.

The mill is interested not only in the mill personnel, but also in their families, and encourages outside interests along a number of lines which tend to make a fuller life for all members of the community.

GOOD JOB; GOOD OUTPUT

As a result of this fair exchange Carlton's personnel stays constant

ONE DRIVES over the only cotton road in Gaston County to get to the Carlton Yarn Mills at Cherryville, N. C., and one finds at the mill a personnel record that is remarkable, for with less than a dozen exceptions the payroll today carries the same names that it did when it was first made up in 1922.

"We give our folks a good job and they give us a good product," was the remark when this writer commented on that phase. Isn't that the answer to a lot of questions? If a mill is making an exceptionally good product and selling it on a quality basis, it generally has little trouble finding a market. On the other hand, the mill operatives must be quality workers and that calls for good pay, pleasant and well kept surroundings, and all conditions which contribute to the workers' best physical and mental capacity, resulting in efficient production.

To begin with, when the mill was first put into operation, extreme care was used in selecting its operatives for ability, workmanship, and character.

"And ever since then," said C. A. Rudisill, treasurer and general manager, "we have stuck to the policy of character building and good housekeeping."

Experience has convinced the management that a well-kept plant was the only place from which a high quality product could come, and that a well kept village and well directed community activities gave them the higher type workers needed. One

The community house at Carlton is made of stone and located in a large grove of trees

The Carlton community library affords operatives an opportunity to read and study during their spare hours

of the most modern community houses in the State has just been completed at Carlton, and in it are centered most of the leisure-time activities of the village.

A fine circulating library is maintained with a librarian on duty at all times. Though the mill is small, she told us 80 people used the library the afternoon before. "They seem to appreciate the library more than any other element, especially during the winter time." We noted that the magazines and books were of the better range of reading.

A well trained girls choir sings for the village community and for the town of Cherryville, and is an outstanding feature of the educational training accorded mill operatives. Other features given them at Carlton are sewing classes, cooking classes, dramatics. Vocational classes are maintained for the men too, in which designing, loom fixing, etc., are taught and from the standing in these classes future workers are selected for special training in the mill.

Industrial relations at Carlton consist of more intangible features than these named, for there is a real feeling of sympathy between worker and management there which is built upon cooperative ideas of thrift, cleanliness, character, ability and community spirit.

NO REMOTE CONTROL

Hudson Silk Hosiery Co. officials "enjoy being with their people"

"CAN YOU tell us where the Hudson Silk Hosiery Co. is?" we asked a filling station operator.

"You go right down Brevard Street and you'll know the place by all the cars parked out in front" were the directions, for Hudson has no village and its payroll is such that the majority of its workers are able to drive to work in their own cars from their homes in the neighborhood.

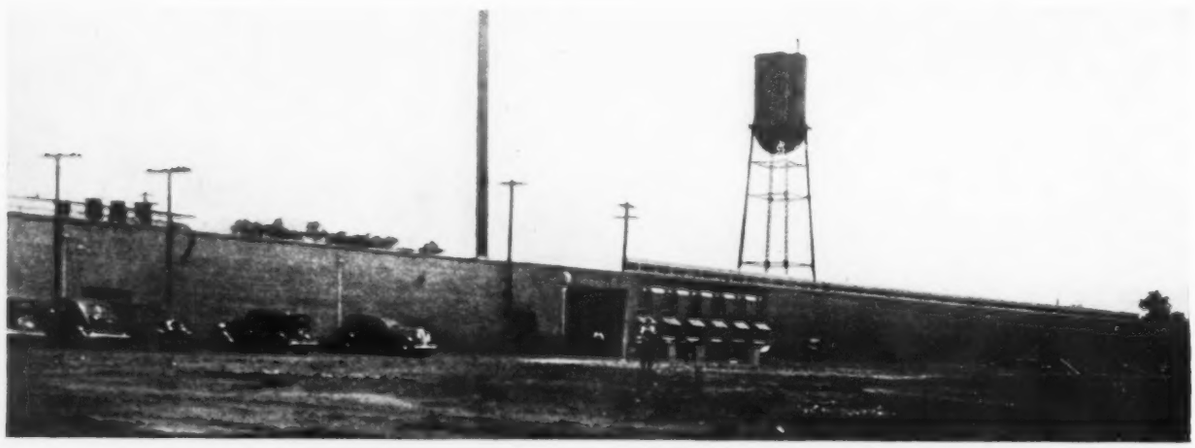
New machinery and air conditioned plants give selected personnel such efficiency that top bracket wages on a piece work basis is the natural result, is the belief of F. Seifart, president of the Hudson Silk Hosiery Co., Charlotte, N. C.

Although a high school diploma is not required of its workers, an I Q equal to that of a high school graduate is, and because of the ideal working conditions found in this plant and the prospect of lucrative advancement offered its workers there is a heavy waiting list for future graduates coming of working age. One may also find among the personnel at this plant several who hold teachers' certificates but who find manufacturing life more profitable than a scholarly career.

Hudson has many records to its credit: not a day's shutdown during the late depression, and maximum production schedule for the next six months in this present recession. Hudson became architecturally famous when it built its windowless plant a year or so ago.

This company is also famous in industrial relations for its savings accounts for the operators; its accident and sick club operated by the workers, members of which may for 15c per week the year round draw payments in time of illness. Loans by the mill are available to the workers if they are confronted with emergency need.

Basketball, bowling, baseball, for which handsome trophies are awarded the winning teams each season are other evidences of the club work in the mill; and, at their new amusement and recreation hall well ordered dances and frolics are held by the workers. All of these recreations are attended by the president, Mr. Seifart, and the manager, M. E. Pierson, "for the simple reason that we do not believe in remote control, and that we



Light, temperature, and humidity are always constant in Hudson's windowless mill. It is built without windows as shown in above photograph and described in several previous issues of TEXTILE WORLD

do enjoy being with our people. We know them all, like them all and it does us good to be with them on what we feel is an equal social basis at these gatherings," said the president.

$40,000 BONUS

Paid Joanna employees last year under profit-sharing plan

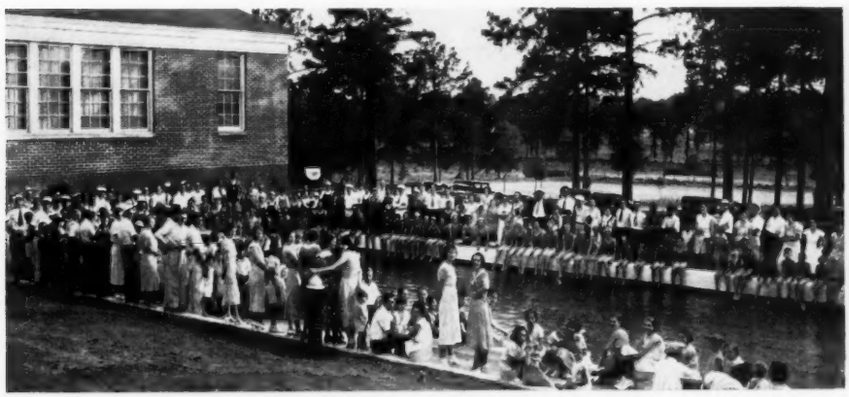
A BONUS totaling $40,000, or 5% of their wages, was paid employees of Joanna Cotton Mills, Goldville, S. C., who had been with the mill one year in January. At all times they receive the highest wages competition will permit, and are given a week's vacation with pay in the summer. In other words, the management has a definite policy of sharing the company's surplus earnings with employees when economic conditions permit.

This practice is in line with the philosophy of the owner, as well as that of the resident agent, William A. Moorhead, who has been at Joanna for a great many years, and has been close to the people from the beginning. Possibly some of Mr. Moorhead's interest in the workers is due to the fact that he spent his early boyhood on a farm where he received more than his share of hard knocks and privation.

A little further insight into the character of Mr. Moorhead may tend to make the situation at Joanna still clearer. He has a very outspoken and definite conviction that the wages of textile employees all over the nation should be raised much higher than they now are. He is so firmly convinced of this that he strongly advocates a wage-hours bill. Furthermore, he is bitterly opposed to third-shift operation which he regards as one of the greatest evils of the industry. Personally, Mr. Moorhead is a very pleasant soft-spoken gentleman whose hobby is "knowing folks." He often attends parties, funerals, and weddings held in the village, and on several occasions, as a notary public, has officiated at weddings of young couples. Naturally, personal contact of this sort on the part of the chief executive at Joanna has resulted in a very close feeling between management and employees.

An example of how the mill has gone out of its way in the interest of workers is illustrated in an incident which happened a short time ago. In November, 1936, an assistant electrician fell from a pole and received serious injuries which resulted in the loss of his left arm and partial paralysis of the right arm. He automatically received the best of medical attention and the usual workman's compensation and insurance benefits. The management did everything for the man it was legally or morally responsible for, yet it wanted to do more. Consequently, when some time later it was necessary to install a new elevator, the mill spent an additional $1,000 to $1,500 so as to include fully automatic controls—simply that the injured man might have a regular job operating the elevator with his one partially useful arm. Today, that man feels he is part of the community instead of an object of pity, which he might have been had the mill been a little less thoughtful.

Houses at Joanna Cotton Mills can be rented for 25 to 40¢ a room per week



A popular recreational spot in the summer at Goldville is the swimming pool, an important part of its community activity

The importance of education is emphasized at Joanna, and high-school graduates are given employment in preference to less highly educated persons. Parents are urged to further the education of their children if they expect them to secure employment in the mill. A child has access to nine grades at Goldville, and is then given free transportation to a larger town nearby where he may continue through eleven grades. An accredited college is also located in this town which is often attended by the young people.

Just how seriously Joanna employees take the matter of education is illustrated in the case of a widow who has lived in the village many years. This woman is completely illiterate, yet out of her earnings she is sending a son through college, has had two daughters graduate from high school, and another is finishing this year.

There is comparatively little welfare work done at Joanna. Needy cases in the village are usually cared for by an organization to which most of the employees belong, and

(Continued on page 116)

High schools in textile towns go in strongly for competitive sports. Here is the Fairfax (Ala.) High School squad of 1937

Wateree Baptist Church at Camden, S. C., built by Kendall Co. for operatives of mill there

The lake at Camp Herman, near spot for Cone mill employees and

Example of older type of southern mill village, which is rapidly disappearing through modernization

Grammar School at Joanna Cotton Mills, Goldville, S. C. High School students are given free transportation into a nearby town

Nursery for infants of mill workers at Pacolet (S. C.) Mfg. Co.

Street in the village of Victor-Monaghan Co., Greenville, S. C.

Greensboro, N. C., is a favorite their families in the summer

One of the finest company stores in the South is that of Brandon Corp., Greenville, S. C.

Vested choir at Carlton Yarn Mills, Cherryville, N. C. Most of these girls work in the mill

contribute 10c. a week. It also pays 60% of hospital bills or surgeon fees for any member who needs medical assistance. Administration is solely by employees.

The mill maintains a graduate nurse subject to call at all times, and there is an emergency hospital where major operations can be performed if necessary by the local doctor in charge. There are no charges for emergency medical treatment or ordinary nursing services. The mill carries a $500 group insurance policy on all employees, which may be increased to $2,000 by the employee if he wishes to pay the difference on his own account.

The mill extends no direct credit to employees, but in cases of real emergency will help worthy persons. Any loans of this nature are made by only one person, Mr. Moorhead, who personally investigates each case.

The Joanna village is one of the most attractive in the South, as can be seen from accompanying photographs. Houses are modern in every respect and are equipped with electricity, water, sanitation, etc. Rent is 25c. to 40c. a room per week, and electricity sells for 6c. per kilowatt hour.

Many Wiscassett employees live on farms of their own; the others in company houses like these

Community activities center around a club house which resembles a luxurious home as far as architecture and furnishings are concerned. The mill furnishes a pasture where the residents may keep cows free of charge, and even goes so far as to maintain a pure-bred bull for breeding purposes. For the convenience of the employees, there is a general store operated as a separate establishment. Credit checks are sold to employees to 75% of their time if they wish them, but there are no payroll deductions for store accounts. Volume of business done at the store is less than 18% of the total payroll.

A HOMELY PHILOSOPHY

Brings third generation of employees to work at Wiscassett

"WE GO on two theories down here at Wiscassett Mills Co.," said J. A. Groves, secretary and general manager of the organization at Albemarle, N. C.

"The first theory is that we believe in getting acquainted with the whole family before we take any member of it into the mill; and, second, we believe that if we give the youngsters the means for proper development, mentally and physically, we won't have to worry at all about the type of men and women that they will grow into."

"Sort of like 'look after the dimes and the dollars will look after themselves,'" we commented.

"Then another thing," Mr. Groves continued, "down here at Wiscassett we drew most of our help from the country when the mill was first built, and we found out that the folks always had a hankering to get back where they could raise a pig or two or have a cow and some chickens, so we have encouraged them to follow that ambition and own their little places near the village. Of course, it is good roads that make that possible . . ."

"And good wages, which enable them to afford the upkeep of a car in order to commute from home to work," we suggested.

"Yes. That is what we really work on down here."

"Do you finance the home-purchase plans for them?"

"No. We don't go in for paternalistic stuff like that. But we recommend them, and give them a credit rating, to the Building and Loan Association instead."

"It seems strange for mill operatives to buy their own homes or farmsteads. We thought mill workers were classed as 'floating population'", we remarked.

"Maybe so," was the answer, "but we have some working in our mills who represent the third generation in this plant. Occasionally a fellow goes up to Greensboro or some place and comes back telling how he saw the world, but we have checked up and find that after they finished looking around they come on home to Wiscassett and we put them back on the payroll because we know then that they really want to stay."

And with this sort of homely philosophy, without any of the fancy efficiency-propaganda attached to many industrial relations programs, the manager of Wiscassett outlined the fundamental principles behind a successful plan of mill productivity and mill operative contentment.

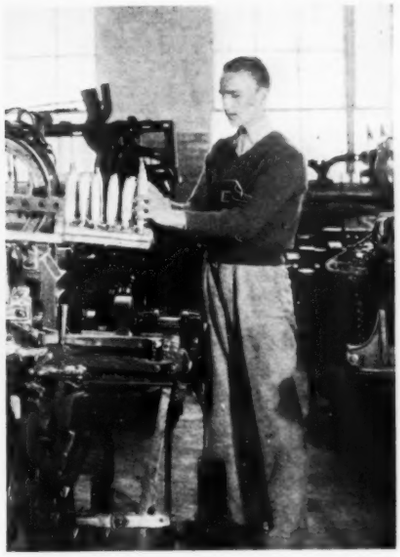
PARKER SCHOOL DISTRICT

Hub of Greenville industrial relations; Spartanburg stresses villages

A VITAL FACTOR in the industrial relations of the 18 textile mills located in or near Greenville, S. C., is the Parker School District. The philosophy back of this educational system is such that its influence is felt by everyone of the 25,000 persons who live in the district, 85% of whom are industrial.

A brief sketch of the District shows that it was organized in 1923 by special act of the State legisla-

Academic training at Parker High School is along progressive lines, and much use is made of visual methods in classes



The vocational school at Parker is extremely popular with the students

ture, and is supported by a tax on the mills benefitting. Combined enrollment is 6,500, with 1,250 of the number in high school. Nerve center of the work is at the high school where L. P. Hollis, superintendent, makes his headquarters.

The first job of Parker District is to educate the young people of the community. This is done through the medium of 17 grammar schools and a high school. Academic courses of the most progressive type are offered in all of the schools, and there is a vocational school affiliated with the high school. It has as its slogan "Practical classes for practical folks."

A study of the vocational school shows that it is equipped with machinery and tools similar to those used in industrial plants. Training in textiles is emphasized, but not confined to that industry. There are also classes in machine-shop methods, automobile body repairing, etc. The courses naturally are kept just as practical as possible. For example, it has been found that in the machine shops the boys are more interested if they work on castings brought in from an actual mill. Further, the nearby mills are often used as "laboratories" where the students may operate machines in actual production.

Part of the Parker philosophy of education is that "if a person wants to learn, he should be given an opportunity—whether he be six or sixty." Consequently, the system has a very definite program of adult education of both a cultural and vocational nature. During the last year 39 trade and vocational extension classes, attended by 661 men and women, were held in the high school and in the various manufacturing plants. When held in the mill, the plant furnishes machinery, light, power and equipment; the school selects and pays the teachers. Often the teachers are the regular mill overseers.

A close check is kept on students at Parker, and a recent study showed that 98.13% of the graduates are either employed or attending institutions of higher learnings. Mill employees who have received the vocational training are likely to be promoted more quickly than those without. For example, one mill recently reported that 80% of its promotions during the last year were from among those who had received such training.

Leaving the work of the Parker School District for a moment, it might be pointed out that living and work-

The Pacolet village of today is thoroughly modern in every respect

Part of the old village at Pacolet Mfg. Co., near Spartanburg, has been preserved to show what mill houses were like 40 years ago. These houses today have been remodeled inside and are used for employee club rooms

Cannon Memorial Administration building of the Stonewall Jackson School, which now has a textile school sponsored by southern manufacturers

ing conditions in the Greenville mills are comparable with most similar areas in the industry. During the last year an estimated 3,000 village houses were repaired and painted at Victor-Monaghan Co., American Spinning Division of Florence Mills, Poe Mfg. Co., Brandon Corp., Union Bleachery, and others. Also, there is a program sponsored by Parker District whereby trained teachers are now visiting the individual homes and helping the people make their residences more livable.

A similar industrial area, Spartanburg, S. C., 35 miles from Greenville, has also been undergoing a program of village improvement and beautification. One company, Whitney Mfg. Co., recently sold its village to the employees. Many of the mills in this area during recent years have become "industrial-relations conscious." This is evidenced in the fact that several have established regular personnel departments for employees. Also, much interest is taken in foreman training, and recently there were two separate cooperative schools in session.

HELP A BOY COME BACK

Textile training important part of program at Stonewall Jackson

WHAT HAPPENS to a boy's psychological self when he is an inmate of a school for delinquency? What happens to him, as a person, when he leaves such an institution? Does the place act as a means of punishment for past misdeeds or is it a school training him to meet some of life's problems in a better and fuller manner? Those questions are asked many times, but like the weather seldom is anything done about them.

On the theory that a boy dismissed from a delinquency school located in the heart of a textile manufacturing State would more easily find a job, and thereby re-establish himself in his own estimation and that of the community, if he was equipped with some practical knowledge of the locale's chief industry, the matter of installing a loom or a spinning frame in the Stonewall Jackson Training School near Concord, N. C., was brought before its board of directors in September 1936.

From that wisp of an idea there has grown in little more than a year one of the most ambitious associational programs in the industrial relations bracket, for the North Carolina Cotton Manufacturers Association adopted the plan as its own and it was decided to install not one loom or one spinning frame but a complete textile unit. Under the direction of Hunter Marshall, Jr., secretary of the association, and an advisory committee of manufacturers comprising Alex Howard, Herman Cone, and L. C. Campayner, what could amount to a vastly expensive program is being carried through on a donation basis. Time, executive experience, engineering ability and machinery are going into the textile unit at Jackson Training School with the only tangible financial burden that of machinery transportation costs, which is being met by the N.C.C.M.A.

Various mills cooperated by giving machinery: breaker, finisher picker, cards, drawing frame, slubber, intermediate, jack and four spinning frames. Alex Davis, engineer of Saco-Lowell Shops, helped in planning and supervising its installation. Erwin Darrin, of the Draper Corp., saw that looms were provided and installed five. Dean Nelson of the N. C. State College was most generous in giving his time to act in an advisory capacity.

Today the miniature cotton mill in which boys of the Stonewall Jackson Training School will learn a trade and, incidentally, produce ticking, denim, shirting and sheeting—products which will be used in the school—is nearing completion. The building still lacks heating units, the "cotton mill" a few other pieces of equipment, but with the continued enthusiasm and cooperation of machinery manufacturers and textile executives it won't be long now before this commendable rehabilitation scheme is on an operating basis.

A final glimpse of the textile workers of the South

Practical Helps

For operating executives, culled from the 1937 issues of TEXTILE WORLD

Kinks for Cotton Overseers

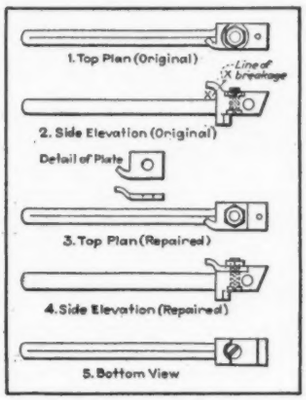
In large-package cotton yarn production avoid too taut ends, which will decrease breaking strength. The extreme of baggy, flopping ends will make unevenly wound, lumpy, gouty bobbins of roving that will in turn make uneven yarn and also cause excessive end-breakage. Too much twist will cause hard ends in many cases, and too little can stretch the roving and lower the break tests.

•

If the number of picks produced in a cloth with a certain change gear (or ratchet) is known, the required change gear to produce cloth of a different pickage may be calculated as follows: (Picks wanted × present change gear or ratchet) ÷ present picks = required change gear or ratchet.

•

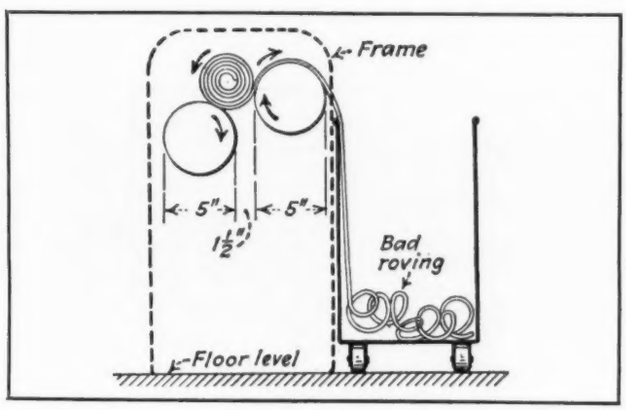
Shuttle spindles on which the lug breaks off as shown in Fig. 2 need not be thrown away. They can be repaired by applying a plate as shown in Figs. 3 and 4. The method is to file the spindle and fit the plate. The latter is held in place by the nut on the adjusting screw.



Shuttle spindles

•

A bad-roving stripper, which can be constructed in the mill shop, consists essentially of two brass rolls, 5 in. in diameter and nearly 5 ft. long, mounted on a framework as shown. The rolls are placed about 1½ in. apart, one a little higher than the other. A ½-hp. motor operates them at about 200 r.p.m., through a pulley arrangement. The revolving rolls, with the aid of friction, quickly



A bad-roving stripper

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and effectively unroll roving placed on the machine, and pile it in a box, which is pushed away when full and replaced with an empty.

•

One of the most important duties of a weaving overseer is to see that his weave room is kept clean. There is no doubt that the clean weave room will show lowest cost of operation, highest rate of production, and lowest number of seconds.

•

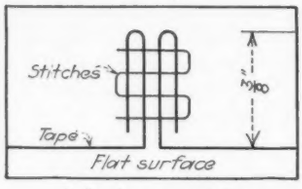
To obtain most satisfactory weaving conditions when running both mercerized and unmercerized cotton yarn in the same warp, it is best to beam the mercerized yarn on one beam and the unmercerized yarn on a separate beam.

•

Real benefits will be derived from the use of charts in keeping mill records. Stock and gear alterations, daily recordings of breaking strength of yarn, humidity, dry- and wet-bulb readings, waste, supplies, costs, labor turnover, and other items involving statistics, can readily be kept track of by use of charts similar to those shown in the accompanying figures.

•

Spinning tape can be sewed together by turning back ends $\frac{3}{8}$ in. twice, and sewing through four layers of fabric, as shown in the diagram. With both ends turned in the same



Spinning-tape joint

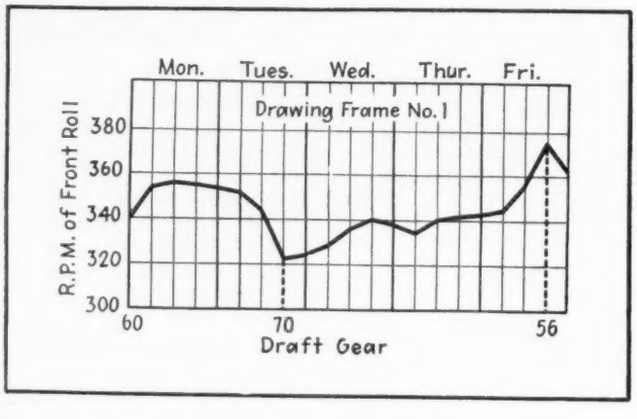
direction, the bottom side is left completely smooth and flat. Tapes sewed in this manner resist turning over to a marked degree.

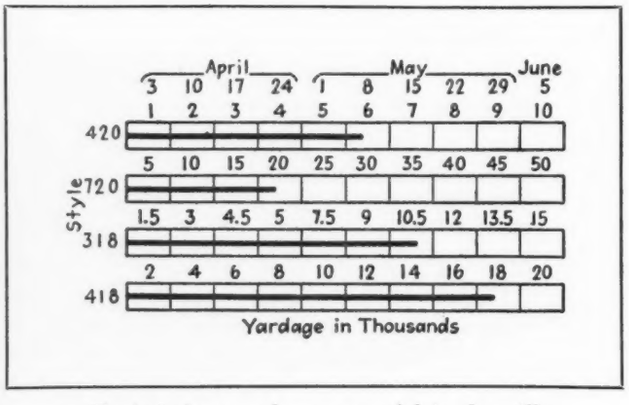
•

The tendency of selvages to stretch and run slack can be overcome by having the harness set and timed so that the shuttle will not enter the yarn until the shed is well open.

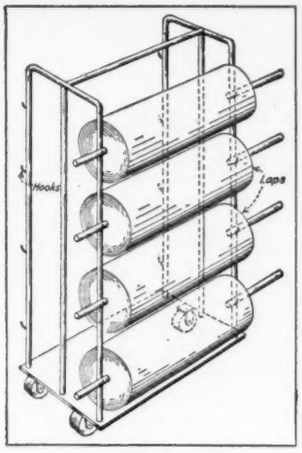
•

A wheeled truck, such as that shown in the accompanying





Typical charts such as are useful in the mill



A wheeled truck

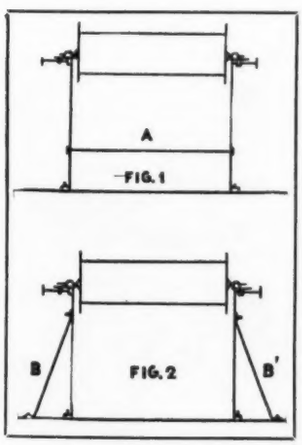
illustration, for keeping picker laps off the floor, can easily be constructed from iron piping. Four hooks on either side, and at each end, accommodate eight laps, which are doffed directly from picker to truck. The truck, when full, is pushed directly to the cards, or to a storage room where it is left until needed. The cotton is not taken off the truck until it is placed on the cards.

•

Thin or light hungry places warpwise in high-count broadcloths can be greatly decreased by using a fine comb at the slasher, with as few ends as possible running through each dent, so that they will not roll over on top of each other.

•

The tierods, *A*, of a section-beamer creel were in the way when taking down empty beams and putting up a full creel, as the tender had to step over them many times—frequently bumping his shins. We removed these tierods and braced the sides of the creel with flat iron braces (⅜x2 in.), *B* and B′, making the beam stands very sturdy and leaving the space inside clear for the tender.



Removal of tierods

•

To line up the box backs of looms, hold the box firmly against the laysword and use a straightedge to see if the filing blocks on the back are high enough to be properly filed down. If they are not, build them up by welding. Do not shim box backs into position; the shims have a tendency to work loose and drop out, and the lining-up will have to be done over again.

•

The length of intervals between weaver's cloth inspections can be increased by installing an easily made attachment that stops the loom when a harness strap breaks. Such a device is comprised of four levers, one above and one below each end of the harnesses. These levers, in turn, are connected to empty drop wires, so that when a strap breaks, the warp stop-motion will act, stopping the loom.

Kinks for Wool Overseers

With tape condensers, if one end of woolen roping is found to be continuously small, it indicates that the tape feeding that end is stretched and slack and is being robbed by the tighter tapes adjacent to it. In this case the tape must be cut, tightened, and respliced.

•

When gilling fine wools, use as little back draft as possible, but have good tension on the ends as they enter the feed rolls. Avoid overcrowding of the pins, especially on ordinary gill boxes. Keep the pins well set up and keep the fallers clean.

•

Wool entering the French comb is said to comb better when it contains from 18 to 20% of moisture. This amount

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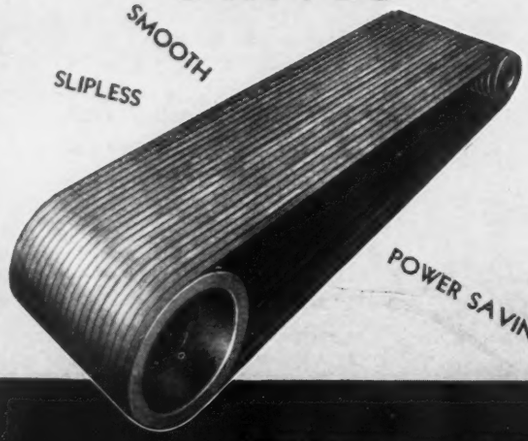

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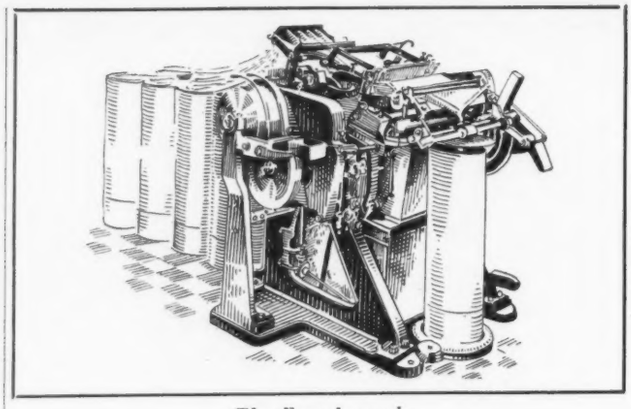
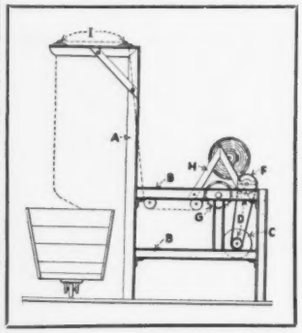


The French comb

of moisture also facilitates gilling; and in order to prevent quick dissipation of moisture, it is necessary that atmospheric conditions be suitable.

•

A method that will put even a rayon and wool mix in good condition to withstand napping in the wet state is as follows: After scouring and hydro or vacuum extracting, the goods are rolled up, two pieces on a roll, and are piled up on a clean floor, no leaders required. The rolls are laid flat, and as many as can be piled on one another are covered with a damp leader and left in this condition overnight. Mills not possessing a rolling machine equipped with a stretch roll can easily construct one with angle iron, rods, pipes, a wooden rolling-up roll, and silent roller chain with sprockets to carry the power from a tight and loose pulley on a studshaft to tbe rolling-up roll. Parts shown in the accompanying illustration are: *A*, 3x3 T-beam, floor to brass pipe, 6 ft. 3 in.; *B*, 3x3 channel frame; *C*, tight and loose pulley, 9 in. diam., 3 in. face, 140 r.p.m.; *D*, sprockets 12 and 21 teeth; *F*, wooden rolling-up roll, 6 in. diam., 66 in. long, 80 r.p.m.; *G*, stretch roll, 8 in. diam., 66 in. long; *H*, roll run, inverted V-irons, ½x2 in.; *I*, brass pipes, 1 in. diam. The stretch roll can be purchased from any machine builder who manufactures such rolls. A standard stretch roll 66 in. wide will fill the bill.



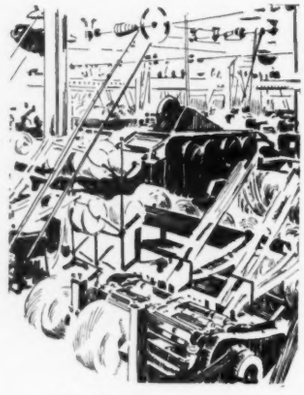
Preparation for wet napping

•

Variation of woolen roping from side to side of the machine during carding can be prevented by keeping the fly strippers sharp and set as close as possible to the fancy; by setting the fancy lightly into the cylinder; and by running at a high speed, though this must be modified according to the type of material being carded. Strippers should be ground at intervals, so that they can hold material without rolling.

•

No machine used in worsted-yarn manufacture should be cold to the touch. Air can quickly be raised to correct temperature; but cold machines, due to their specific heat, require a longer period of time to become warm enough. Cold machines will cause an increase in flyings, brush-waste and laps. In addition, the end will not be so smooth.



Avoid cold machines

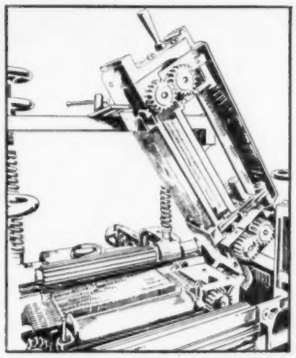
To simplify production control in the rewinding department, one overseer puts all the winders on teams consisting of five girls each. As demand falls off, any number of teams can be sent out, leaving just enough girls for the work on hand. Teams are sent out only one day at a time; with this arrangement, each girl receives some pay every week.

•

Winding of rubber and other backed carpets can be facilitated by rolling with the pile toward the outside of the roll. This is also an advantage in the subsequent unrolling and laying, as it will prevent the carpet from curling up at the ends. When following this procedure, the outside layer should be protected from the possibility of soiling.

•

A handy truck on which four three-piece rolls of fabric can be placed as they come off the combination steam brush and dewing machine is shown in the accompanying diagram. After the goods have been allowed to set overnight, the pieces can be pulled over the perch without lifting the rolls from the truck. Gudgeons extending 8 in. from each side of the rolls permit the rolls to be handled easily. A ⅞-in. maple floor on the bottom frame will add to the strength and life of the trucks and furnish protection to the goods from the dust of the finishing room floor. A few coats of orange shellac on all the woodwork adds to the permanency of the outfit.

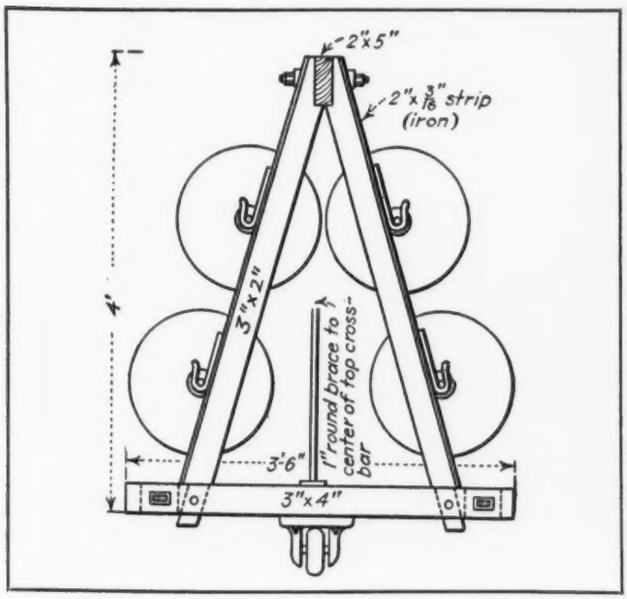


Piecings on gill box

Good piecings are vital on all gill boxes, and especially is this true before the French comb. Any lumps, slubs, large burs, and loops play havoc with the pins of the fine segment of the cylinder. Large burs may cause the nips to be held apart, with reduction of pressure. In addition, the cylinder pins may strike against the projecting burs, with disastrous results.

•

When a tender lot of warp yarn is discovered, very often it is not necessary either to weave the poor yarn as it is or to make another lot, as the weak yarn can be used in combination with a stronger lot. Have all ends of the weak yarn on the first harnesses and on separate harnesses from strong yarns. When the warp is put in the loom, the stirrups operating the front harnesses should be lowered on the harness jacks so that they will not raise or



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lower these harnesses as much as those holding the stronger yarn. When this is done, most of the weight of the warp pull will be on the strong yarn, with little strain on weak ends.

Kinks for Rayon-Silk Overseers

A loose picker or a nut loose on the heel bolt in the shoe are common causes of shuttle marking. If the hole in the picker is particularly deep, this may cause the shuttle to be thrown with a slightly upward movement as it leaves the box, and in descending to its normal level the shuttle will strike the warp and leave its mark.

•

For pure-dye fabrics, reed width should be about 6% more than the width wanted in the finished cloth; while for weighted goods, it should be 10% or more. This applies to crepe-de-chine only; crepe satins will require 15 to 20% more, depending on the quality.

•

Drop wires which have become rusted or bent should not be used. Rust will cause surface roughness, and chafing of yarn will result, especially if the round edge of the eye is not perfectly smooth. A bent drop wire is ineffective, as it will not fall the required distance should the end break.

•

When weaving rayon on cotton looms, to protect both the warp yarn and the shuttle in its flight, the race plate should be covered with smooth-surfaced felt of a hard-wearing nature. If the existing race plate is made of steel, this should be replaced by one made of wood, reduced in thickness to permit a perfect line-up with the shuttle-box plates when felt and race plate are in position.

•

Center loops can most always be traced to the center filling-stop-motion. Usually it will be found that the filling feeler-wires are holding the filling down as the reed beats the pick into the cloth.

•

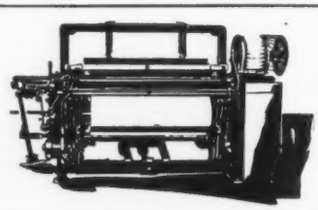
To keep low the number of shires in crepes and other similar fabrics, worn felt rollers should be replaced at once. The rollers should be cleaned bright, given a coat of shellac, allowed to dry thoroughly, given a second coat of shellac, and again allowed to dry before the felt is put on with another or third coat of shellac. Felt rollers repaired this way will hold until the felt is worn out.

•

The warp line should be kept at the same height as the level line from whip roll to breast beam when weaving rayons. Correct elevation of drop wires is easily ascertained by threading a drop wire with a piece of cord and suspending this cord along the warp line.

•

The best way to insure a proper start, when sizing rayon staple on cotton slashers, is to use an anti-friction bearing for the beams, and to have an adequate stretch-control unit to take the yarn from the beam and equalize the tension in all sheds of the set before the yarn passes under the immersion roll into the size.



Rayon in cotton looms

Cause of pinheads in fabrics

Spindles that are low, high, or bent sidewise against the sides of the shuttles will cause pinheads in silk fabrics. Keep spindles level and perfectly straight at all times; otherwise, the filling will come off with a jerk.

•

In silk and rayon throwing machinery, the spindle bases should never be more than half full of oil; otherwise the oil may work upward and drip or be thrown onto the yarn of adajacent spindles.

Kinks for Knitting Overseers

On seamless machines of the type that controls the length of stitch by variation in the height of the needle cylinder, if lengths of stockings manufactured are to be kept within tolerable limits, the height of the cylinder must always come to exactly the same level at the same portion of each successive hose.

•

In order to obtain best knocking-over action on full-fashioned machines, it is necessary to have needles and knocking-over beds in absolutely right height relations with sinker beds. If the alignment is not accurate, the knocking-over beds will have to be lowered to avoid injury to the fabric, selvages being sacrificed.

•

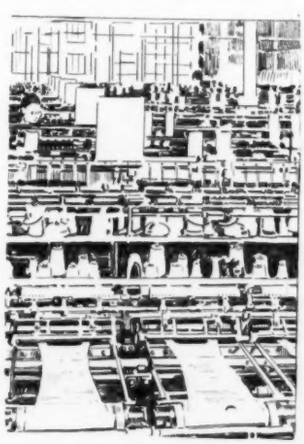
Regular inspection of the yarn-changing fingers on half hose knitting machines, to determine whether they are weak and likely to break and cause a "smash," will save fixers trouble. If there is a sharp click when the finger goes down, it is all right. If the click is less pronounced, put in a new finger. It is also possible, by touching these springs with a small screwdriver, to judge whether they are getting old and feeble.

•

When producing brushed finishes, knitted fabrics with a pronounced wale may cause trouble, because the ridge secures too great a degree of brushing, while the valley is insufficiently brushed. In fact, some fabrics of this type are unsuitable for brushing. Where the wale causes trouble, it is possible to mitigate this to some extent by first giving the fabric a light calendering or pressing, by means of which the surface is temporarily flattened. This treatment should not be overdone, since, if the fabric is made too flat and thin, there is considerable risk of the brushing wire piercing through the fabric and damaging it.

•

Knitting-machine sinkers should never be used beyond the time when it is observed they are impairing the quality



Watch the sinkers

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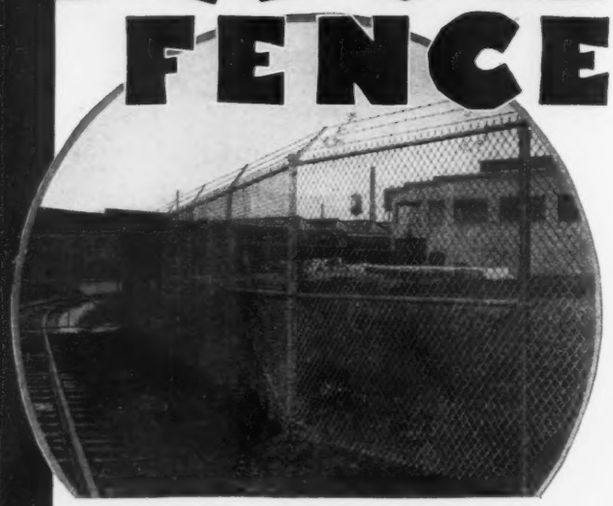

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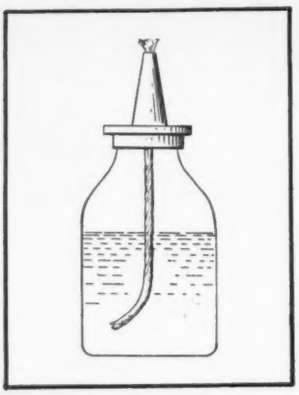
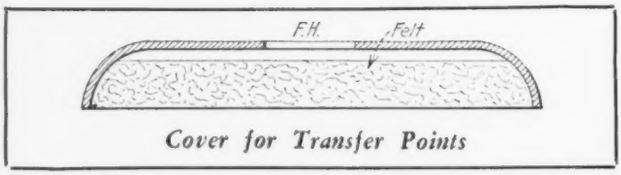
of the fabric. Under no circumstances should we insert sinkers which are of different makes from those already in the machines. Slight variations in their size make it impossible to use several brands in the same head without dire results.

•

A durable, rust-preventing cover for transfer points on half hose knitting machines can be made as shown in the diagram. This cover is a shallow, cup-shaped device made of hard fiber. It is designed to fit the contour of the points, but is slightly larger in diameter to accommodate a felt ring about ¾ in. wide. This



For oiling



Cover for Transfer Points

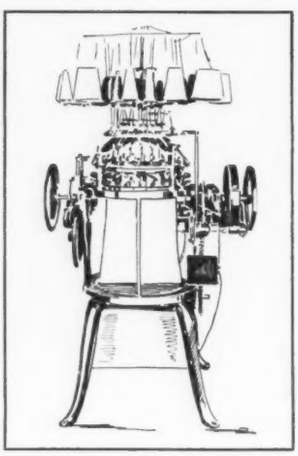
felt ring absorbs any moisture that may collect on the points when they are not being used.

•

Knitting mills can save a great deal of money and trouble by giving latch-needle rib-body machines a thorough overhauling at frequent intervals, instead of waiting for them to break down and then having to make expensive repairs. It is preferable to have one man overhaul on regular schedule.

•

For oiling knitting-machine needles, use a 1-quart jar of the character employed at filling stations, with a cotton rope about 8 in. long run through the neck for a wick (see illustration). The rope absorbs the oil in the bottle by capillary attraction; when the end which projects from the bottle is held against the revolving needles, they are well greased but not flooded. The spout, which holds the wick, is screwed off to permit refilling of the jar.



Overhauling body machines

•

When knitting seamless hosiery, machine speeds should be kept very uniform. There are cases where the machine speeds vary as much as 20%. This is altogether too much; a 5% variation should be the limit for good results.

•

It will be found occasionally that the catchbar on full-fashioned hosiery machines does not cover one head without bumping on the next so it will not fall; in this case the verge plates, jack beds, and sometimes the needles should be realigned.

Kinks for Processing Overseers

The shade of acetates colored with dyes which are not susceptible to the action of sodium hydrosulphite or other reducing agents can be lightened sufficiently for dyeing by working the cloth for 30 min.

DRYING COSTS CUT

by *Proctor 1938 Models*

MODERN DRYERS REDUCE COST AS MUCH AS 50%

Since PROFIT is dependent today on cutting production costs to the lowest possible level, a large number of textile mills are putting in new Proctor Dryers. These modern, super-efficient drying machines bring large savings in time, steam, labor productivity, motive power, floor space and upkeep.

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Up to 54.5% reduction in spooling time.

Up to 60% reduction in number of knots with consequent reduction in burling cost and improvement of fabric.

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A better yarn, with less than 5% variation in size per 50 yds. Also stronger, more elastic, more lofty and more accurate diameter.

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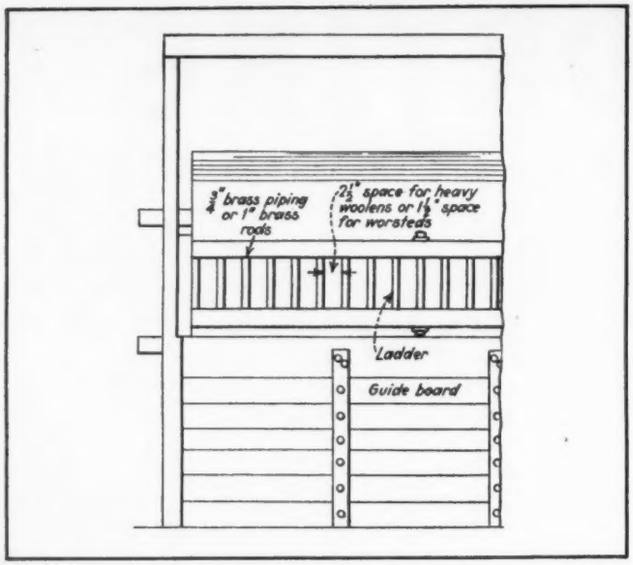


Ladder-guide on a cloth washer

in a 5% water solution of Butyl Cellosolve at 195° F.

•

To obtain a scroop finish on glazed yarn, take a thread dresser and remove the brushes. At the creel end fit a double-jacketed steam-heated trough with a 4-in. brass pipe revolving at a speed of 2 r.p.m. in 132° hot paraffin wax, with the roll half immersed in the wax. Run the glazed thread from the creel to the wax roll, giving ½ in. contact, thence to the take-up at the full speed of the machine. Probably tension bars will be required; if necessary, put on temporarily with wooden dowels.

•

An effective size mixture for rayon fabrics which require softening consists of 1 qt. of 26 deg. Bé. ammonia, 6 qt. of sulphonated olive oil, and 1 qt. of glycerin to 50 gal. of water. The fabric is sized on a two-roll mangle and is run directly into a crepe dryer or a loop dryer.

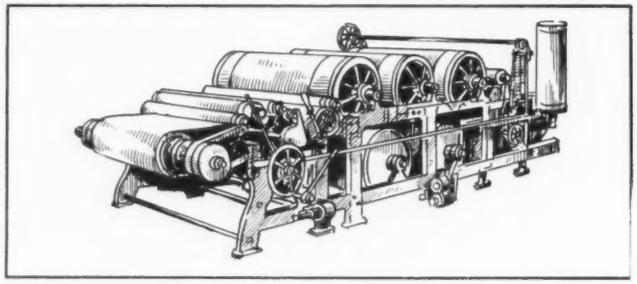
A master mechanic can easily construct ladder guide boards for use in place of ring boards on cloth washers, as shown in the accompanying diagram. Rungs of the guide boards can be constructed of brass piping or tubing. For serges or other tightly-woven goods, they should be spaced 1½ or even 1¼-in. apart. For heavy woolens, a 2½-in. space should be allowed. Such guide boards will be found of great assistance in preventing wrinkles.

•

When ageing draperies and other well-covered patterns, one frequently finds they take up moisture from the steam faster than it can be replaced by new, moist steam. In this case 300 to 400 yd. should be aged and then a leader or plain piece of cloth, preferably moistened, run in to allow the ager to cool off and the moisture to be replaced in the ager atmosphere.

•

Only dyes which are known to level easily should be used



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for redyeing rayons. Some of the new wetting and penetrating agents, such as the fatty alcohol sulphates, are a big help in overcoming any tendencies to streak. Pine oil preparations are also of value for this purpose.

•

Weigh each dye in a formula separately, instead of trying to weigh two or more dyes in the pan at one time. By weighing one dye at a time, you can easily remove any excess

DRUG ROOM
Color Formula

Mach. No. 8 Date 4/5/37
Color Cuba Tan Style 301 (Silk leg, Cotton plait)
Amt. 100 doz.

Dyes	Weight - Grains	
Cotton Brown	536	✓
Cotton Red	154	✓
Cotton Black	110	✓
Silk Brown	1300	✓
Silk Yellow	375	✓
Silk Black	495	✓
Remarks:		

Weigh dyes separately

amount which may have been placed on the pan. When two or more dyes are in the pan, it is difficult to remove a portion of a particular dye to rebalance the scale without also scooping up parts of other dyes adjacent to it, and thus disturbing the formula.

•

Continuous boiling-off of rayon and acetate jacquard matelasses can be carried out with a layout as shown in the accompanying sketch. Box 1 is filled with hot water. The purpose of the large rolls is to prevent the cloth from shrinking too rapidly. Enough tension is used to keep the matelasse pressed tightly, with full width, against the rolls. By shrinking the fabric gradually, breaks are prevented. Once the initial wetting out is done evenly in Box 1, the cloth drops loosely onto a carrier, where the complete lack of tension allows the fabric to reach its maximum shrinkage. Box 2 contains a 1% soap solution at 185 to 195° F. Box 3 is used for a warm rinse. Box 4 is used for a final cold rinse.

•

Slow dyeing of mohairs is preferable to hurried dyeing; the take-up of dye by the mohair may be restrained by various additions to the dyebath, for there is great danger, in the later stages, of the mohair becoming over-dyed, and a slight overheating in one place will cause the color to be taken up so rapidly that it cannot be made even by further boiling, as would be the case with acid dyeing of wool. Addition of any alkaline salts to retard dyeing will result in the tendering of the mohair and should be avoided; rather, reduce the amount of salt and use a neutral leveling agent and dye at 180° F. instead of at the boil.

•

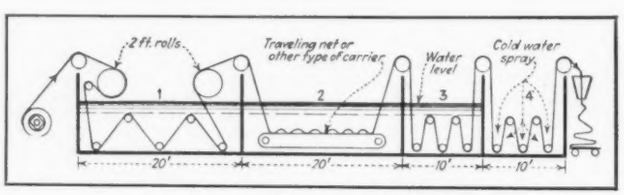
Rayon fabrics which are quite wide after redyeing, due to lack of elasticity, can often be reclaimed or at least greatly improved as to final appearance. The dry cloth is first sized on a two-roll mangle, then run directly into a dry box, and taken off into a basket. This permits maximum shrinkage, both lengthwise and widthwise.

•

When troubed with rising ager temperatures, it is a good practice to change the burlap flooring. This burlap, when new and in good condition, will absorb and hold considerable moisture, and in this manner will help to keep the ager temperature at an even level.

•

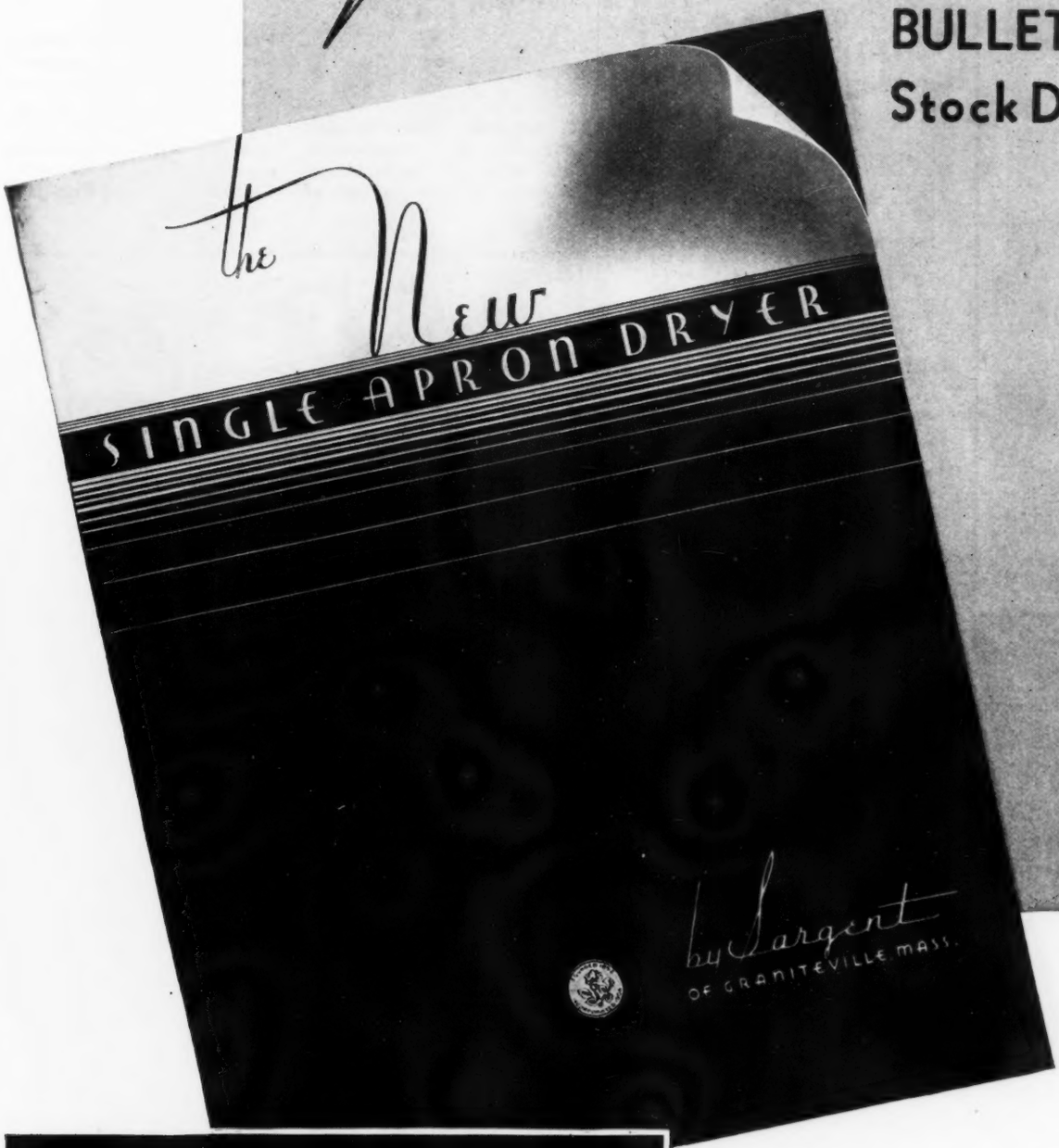
A shower made up of 1¼- or 1½-in. pipe equipped with a quick-opening valve, giving a strong impact of a 1¼-in. stream of water, will make pos-

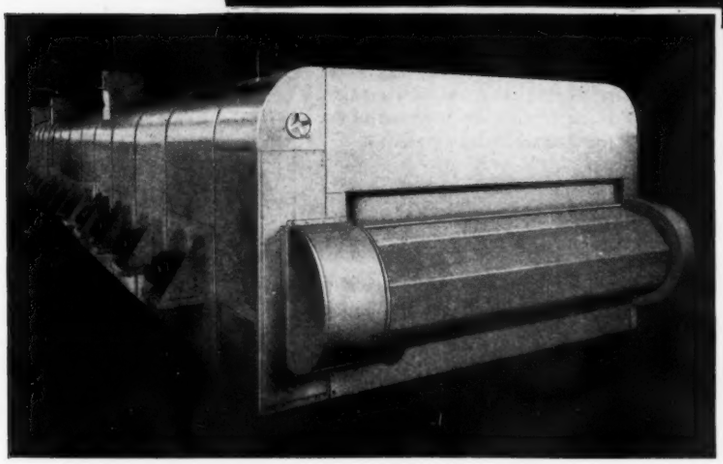


For continuous boiling-off

You Should Have This

BULLETIN on Stock Dryers





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sible efficient and quick first aid in treating chemical burns. In many plants, where operations are carried on quite some distance from a shower bath, it is advisable to have tubs or barrels of water nearby into which workers can jump in an emergency.

•

A necessary part of ager equipment is a thermometer that extends to the middle of the ager, between the folds of the cloth, equidistant from the bottom and top rolls, and connects with a recording chart. The thermometer should be located about halfway between the front and middle of the ager, as most of the heat generated from the chemical action of reducing vat colors collects at this point.

•

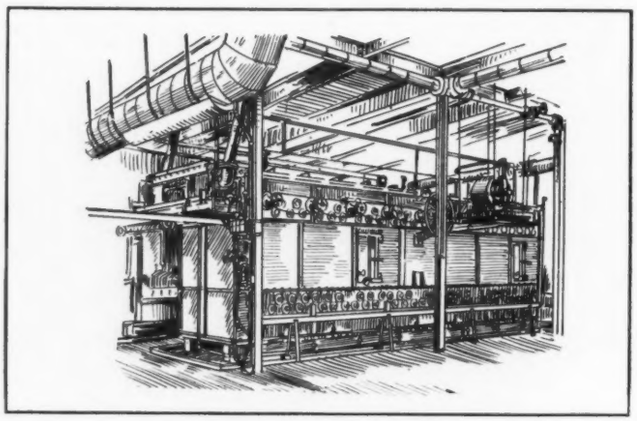
When redyeing rayon fabrics it is best not to centrifuge the fabric too hard after dyeing. Over-extracting results in sharp, hard creases, which are difficult to remove. Full-width vacuum extraction or even squeezing on a two-roll mangle is preferable in most cases to the usual hydro-extracting.

•

Prevention of washer wrinkles on goods which are not fulled requires use of just enough alkali or soda ash to saponify the particular oil used in lubricating the stock; an excess so hardens the stock that formation of wrinkles is easy.

Kinks for Engineers and Mechanics

Probably the most common way to accomplish expansion of the output of a boiler is by increasing the air or fuel supply, or both. The more common accessories for increasing capacity include stoker, stack, induced- or forced-draft fans, economizer, air heater, superheater, furnace water walls, etc.



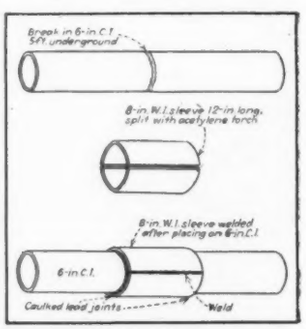
Thermometer for check on ager

•

Motor burn-outs can be reduced to a minimum by means of a careful system of checking and cleaning. If proper attention is paid to voltage conditions, loads, and cleaning, little trouble will develop during the life of a motor.

•

A quick pipe repair can be made by splitting longitudinally, by means of an oxy-acetylene cutting torch, a piece of


Break in 6-in. C.I. 5-ft. underground
8-in. W.I. sleeve 12-in. long, split with acetylene torch
8-in. W.I. sleeve welded after placing on 6-in. C.I.
6-in. C.I.
Caulked lead joints
Weld

Pipe repair

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Textile World's *PRE-VIEW*

of the

34th Annual Knitting Arts Exhibition to be held in Philadelphia, April 25 - 29 will appear in the

KNIT GOODS SHOW NUMBER

to be published April 12th

New trends and developments in hosiery . . . underwear . . . outerwear . . . *an issue you won't want to miss.*

standard wrought-iron pipe, slightly larger than the pipe to be repaired. In the illustration an 8-in. pipe was used to repair a 6-in. fire main. After the repair piece is split, it is placed over the break and then welded together again. Following welding, the now one-piece sleeve should be centered over the break, properly yarned with oakum and then poured with molten lead, which is well caulked after cooling.

•

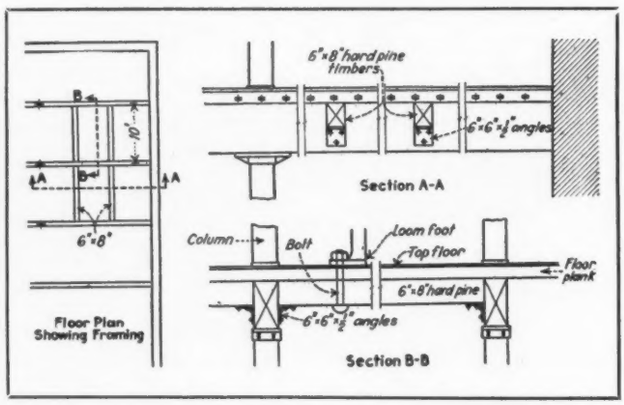
The back feet of looms have a tendency to pull up on the floor. In fact, both back and front feet do, but the upward forces are greater on the back feet. Accordingly, even though the floors are sufficiently strong to support a downward load, they may not be capable of taking an upward load. In many instances, the maple top floor is not fastened securely to the planking of the sub-floor. Again, if the sub-floor is not fastened adequately to the frame of the building, the result is that the looms lift the top floor and sometimes the sub-floor. The only thing to do in such cases is to stiffen the floors, as shown in the diagram. With the 6x8 timbers in place under the loom feet, the lag screws can be put down through the floors into the timbers. Better still, bolts can run down through the feet, the floors, and the timbers. Such an arrangement gives the maximum of stiffness.

•

Where lineshafting is to be used for driving looms and is already in place, a straight line on the floor is secured by plumbing down from the shafting, care being taken, of course, to see that the plumbing is always from the same side of the shaft. Mainly to avoid criticism, whether deserved or not, from those who will later observe the weave room with a fault-finding eye, it is well not to fasten any looms down until a number have been leveled, in order that a uniform height throughout the room can be assured.

•

New belts contain lubricating materials which are gradually forced out by the continuous bending and pulling action and which must be replaced from time to time; otherwise the leather will dry out, becoming brittle and lifeless. Among the first signs of dryness is a glazing of the surface, which produces slipping



A good foundation for looms

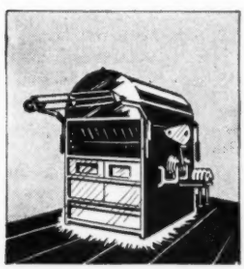
and heating. In order to keep leather belts in good condition, a good lubricating dressing should be applied from time to time. One of the best of these is a mixture of cod oil and tallow, warmed together to form a paste. Neats-foot oil is also an excellent dressing for this purpose and is extensively employed. If castor oil is used, only the highst quality medicinal oil should be employed, as the commercial grades become rancid, producing acids which rot the leather.

•

If a belt runs to one side of a pulley it may be remedied by attention to one or more of the following three causes: the shafts may not be parallel, the pulley may be out of alignment, or the load may not be sufficient to hold the belt on the crown of the pulley. Weaving back and forth may be due to insufficient crown on the pulley, or the pulleys may not be

THE SIMPLE FACTS ABOUT *Stainless* IN TEXTILE MACHINERY

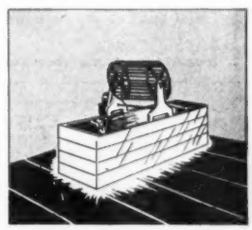
Making the most efficient use of stainless steel in textile machinery is not the complex matter it may seem at first glance.



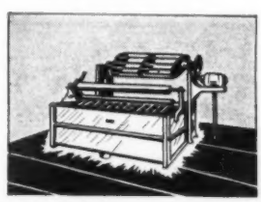
The facts about Stainless are simple. Dyes, bleaching agents and other solutions do not get along well with most of the old equipment materials. You know why from experience.

Stainless steel and, if you'll permit us to say it—Armco stainless—goes into your mill under no such disadvantage. Its dense smooth surface resists the corrosive action of dyes. A simple rinsing washes out one color and you are ready for another. And the right grade of stainless for the application will not corrode and ruin your work. Colors run true through batch after batch. Dyeing, bleaching, washing and all the other operations go faster than ever before.

Consider maintenance, too. Your Armco Stainless equipment will outlast the old equipment many times. What if it does cost a little more initially? The slight extra cost will pay for itself quickly; for the time you save changing colors goes on the credit side the first day and every day thereafter. Production immediately yields more profit—and keeps on yielding more profit.



There are a lot of technical things we could tell you, but these are the simple facts. For more information about the many applications and advantages of Armco Stainless Steel, see your equipment maker. Or, write us direct, and we will tell you some interesting things and refer you to a competent fabricator. The American Rolling Mill Co., Executive Offices, 2571 Curtis Street, Middletown, Ohio.



ARMCO

ARMCO STAINLESS STEELS

WHITMAN Yarns

MONOMAC SPINNING CO.
LAWRENCE, MASS.

ARLINGTON MILLS
LAWRENCE, MASS.

NONQUITT MILLS
NEW BEDFORD, MASS.

CRAMERTON MILLS
CRAMERTON, N. C.

TALLAPOOSA MILLS
TALLAPOOSA, GA.

WILLIAM WHITMAN COMPANY, INC.
NEW YORK BOSTON PHILADELPHIA CHARLOTTE

NOVELTY-YARNS
For
WEAVERS-KNITTERS
MONTGOMERY
WINDSOR LOCKS, CONN.
Designers and Spinners of Novelty Yarns

TEXTILE WORLD'S
KNIT GOODS
Show Number
will be published
April 12

true or properly installed. Underloading may also produce this result.

•

The practice of installing electric feed lines capable of carrying a load of from 50 to 100% greater than immediate requirements is good insurance; yet it involves only a small additional investment, since the labor is the same, regardless of the size of wires used. In addition, oversize feeders help in maintaining a high power factor.

•

In oiling loom picker rods, the application is best made by pouring oil on a piece of cloth, or a small mop, and rubbing it the entire length of the picker rod. If an oil can is used, there is always danger that excessive oil may be thrown on the material being woven when the loom is started up.

•

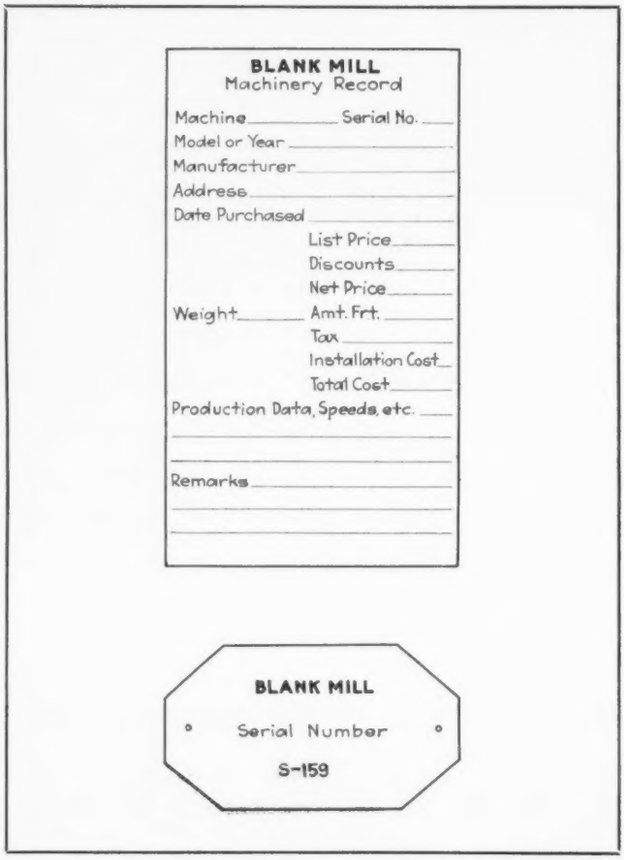
If belts become oily, the free oil can usually be absorbed by holding chalk or whitening against the moving belt. The surface should then be carefully scraped with a dull knife to remove all foreign materials which might interfere with transmission of power.

•

In setting up looms in a weave shed, after the looms are level and in perfect line, they should be lagged down with a suitable lag screw in every hole (including those in the countershaft casting, where such a shaft is used). Fixers who skimp by using only, say, half the screws required will eventually find their looms shaking loose.

•

A machinery record system, consisting of a metal identification tag on each machine and a card index of data concerning the machine, will eliminate much trouble and guesswork when it becomes necessary to ascertain information regarding any particular piece of equipment. Each machine is given a serial letter (C = carding, S = spinning, etc.) and a serial number, so that it is readily identifiable at any time. The machine tag and the index card are pictured in the accompanying illustration.



Components of a machinery record system

FORECASTING SUCCESS

for fabrics made of

CROWN RAYON

—ELIGIBLE TO BEAR THE MARK OF CROWN TESTED QUALITY

The story of CROWN TESTED RAYON FABRICS identified by the mark of CROWN TESTED QUALITY, is read each month, in their favorite magazines, by more than 14,000,000 women —the ultimate customers who will make your fabrics successful.

FORWARD WITH CROWN RAYON

CROWN VISCOSE RAYON • CROWN ACETATE RAYON • CROWN RAYON STAPLE

PLANTS

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Lewistown, Pennsylvania Meadville, Pennsylvania
Parkersburg, West Virginia Nitro, West Virginia
Front Royal, Virginia

SALES OFFICES

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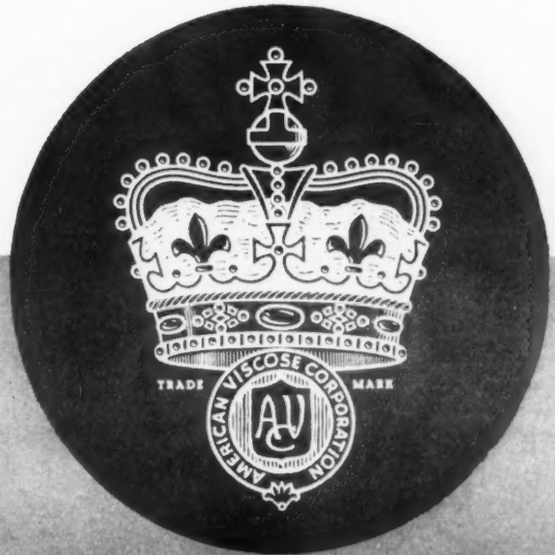
AMERICAN VISCOSE CORPORATION

World's Largest Producer of Rayon Yarn

200 MADISON AVENUE, NEW YORK CITY



Copr. 1938—American Viscose Corporation

WHEN YOU PAINT, WOULD PENNIES *or*

If you buy paint simply by COST PER GALLON, *you may save pennies...and lose dollars*

The real measure of paint economy is not cost per gallon

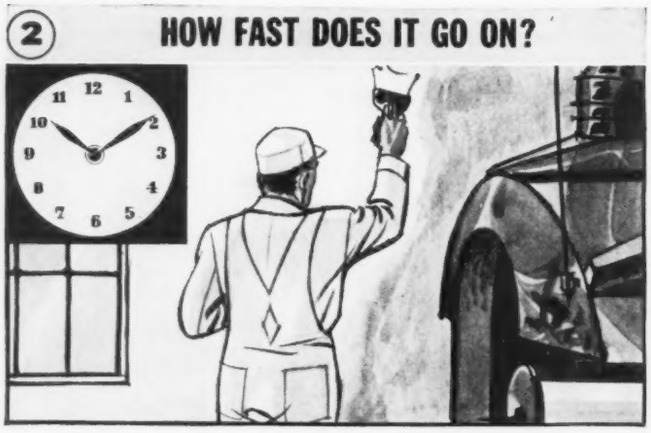
IT'S COST PER JOB PLUS COST PER YEAR OF SERVICE

IT isn't necessary to pay a high price for a good mill white. Nor is it economy to buy the cheapest. You may save a few cents per gallon. But you will lose dollars if the mill white takes longer to apply, and requires more gallonage to do a good job.

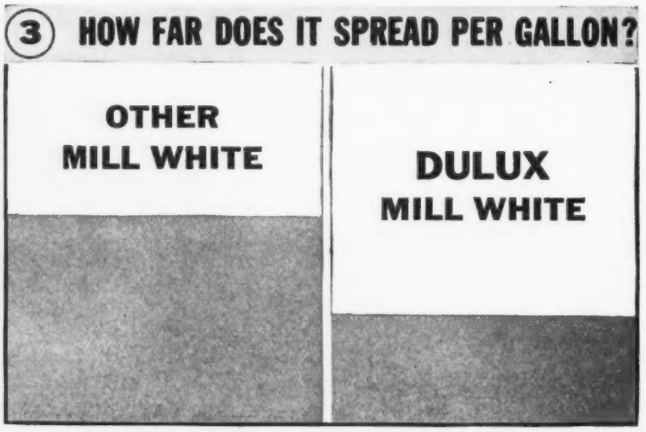
Labor costs far exceed the cost of any paint. Naturally, the mill white that does a good job *fastest* with *fewest* gallons costs you least.

Judge the mill white you buy by the *six* qualities a mill white must have to keep your paint overhead down to the lowest possible point.

The intense hiding of DULUX Mill White means fewer coats needed. This saves gallons, labor time and your Company's money.



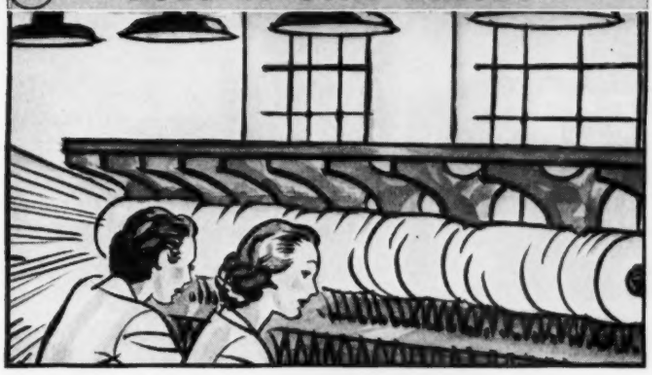
DULUX saves brushing time. It flows smoothly, evenly quickly... and it's self-leveling. Painters cover more area per hour. More labor time saved here.



Impartial tests prove that DULUX Mill White spreads considerably farther per gallon. This means that you need fewer gallons for the job.

YOU RATHER SAVE DOLLARS?

4 DOES IT STAY WHITE?

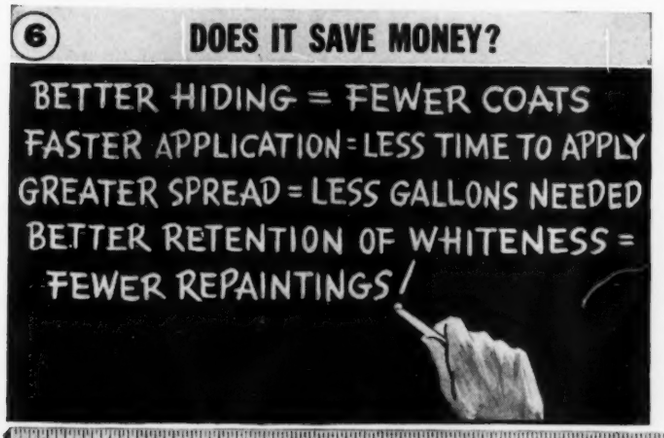


The *whiter* whiteness of DULUX Mill White means maximum light reflection . . . it keeps its whiteness longer.

5 HOW LONG DOES IT LAST?

The amazing durability of DULUX means big savings, because of fewer repaintings over a period of years.

6 DOES IT SAVE MONEY?


BETTER HIDING = FEWER COATS
FASTER APPLICATION = LESS TIME TO APPLY
GREATER SPREAD = LESS GALLONS NEEDED
BETTER RETENTION OF WHITENESS = FEWER REPAINTINGS!

DULUX Mill White has the right balance of these important qualities to give you a better job . . . with less gallonage . . . in a shorter time. This means lowest cost per *job*—the real measure of paint economy. More than that, this whiter, amazingly durable mill white stays white longer. And *this* keeps paint maintenance costs down to the lowest possible minimum.

Do *you* know about DULUX? If not, you may be spending more than necessary on paint overhead. A Du Pont maintenance engineer will be glad to call and give you full information. Send in the coupon below for complete story.

DUPONT **MEASURE PAINT VALUE BY THE PERFORMANCE YARDSTICK** DUPONT

DUPONT
REG. U.S. PAT. OFF.

DULUX MILL WHITE
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STARTS WHITER · STAYS WHITER

E. I. du Pont de Nemours & Co., Inc., T-38
Finishes Division
Wilmington, Delaware

Please see that I get full information about DULUX Mill White.

Name.....

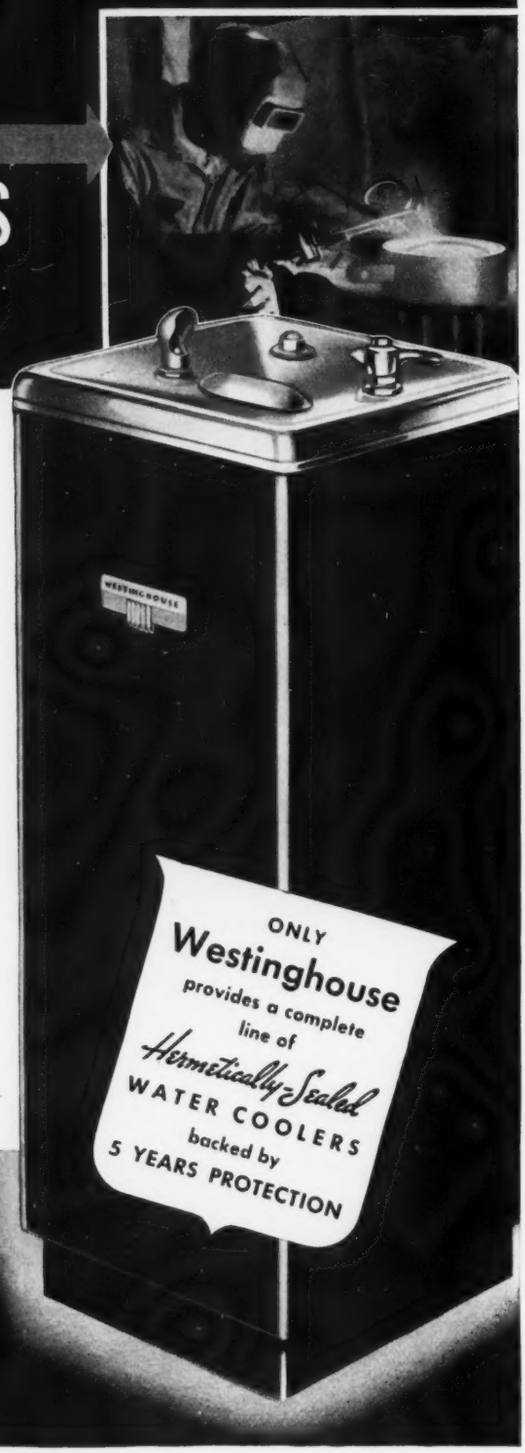
Firm Name.....

Address.....

City.....*State*.....

YOU'LL BE DOLLARS AHEAD WITH THE WATER COOLERS THAT ARE *Hermetically Sealed for*

EXTRA YEARS OF TROUBLE-FREE PERFORMANCE



The very LIFE of a modern Water Cooler is its MECHANISM. The Westinghouse mechanism is sealed inside an airtight case of solid steel . . . Hermetically-Sealed . . . to PROLONG that life.

The exacting demands of industry make severe tests for *any* water coolers. Westinghouse Coolers have proved outstanding ability to meet these tests.

Such features as large ¾ inch, "free-passage" drain . . . special capacity booster . . . high efficiency cooling chamber . . . Built-In Watchman thermostat . . . lifetime lubrication . . . water or air-cooled mechanism . . . assure the EXTRA efficiency, economy, capacity and dependability that industry needs.

And in addition to all these advantages, the Westinghouse Hermetically-Sealed Mechanism is backed by

. . . 5 YEARS' PROTECTION

Ask your Westinghouse dealer for free copy of a useful folder — "How to Check Drinking Water Costs" or write — Westinghouse Electric & Manufacturing Company, Section 8204, Mansfield, Ohio.

Westinghouse WATER COOLERS

HERMETICALLY SEALED FOR *Extra* YEARS OF TROUBLE-FREE PERFORMANCE . . . BACKED BY 5 YEARS PROTECTION

Explosion-proof models available

For Beauty in Fabrics

YOU can always depend on "Avitex" finishing agents to bring the utmost in beauty to your fabrics. "Avitex" finishes for cotton, linen, and rayon achieve far superior soft and full effects ...rich, silky, or glossy...at no increase in your present finishing cost. Also, they are proof against air oxidation, yellowing, rancidity, or unpleasant odor, even after long periods of storage. Write our nearest office, and we will gladly supply technical information on this remarkable line of "Avitex" finishing agents.

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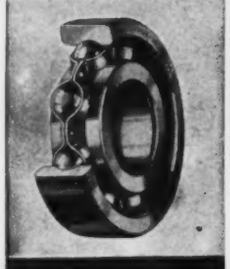
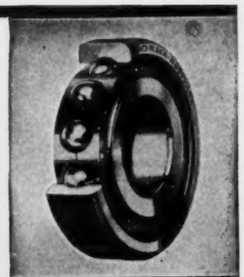
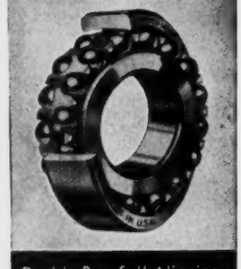
"NORMA-HOFFMANN"

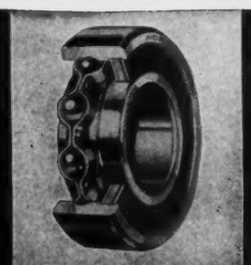
Separable (Magneto) Ball Bearing

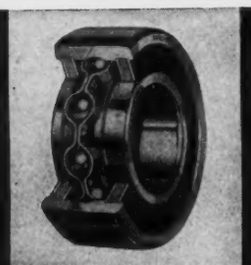

Single Row Ball Bearing

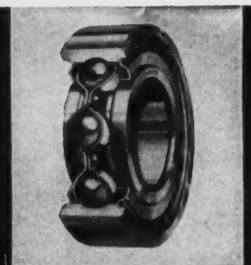

Litro ("CL") Composition Retainer Ball Bearing

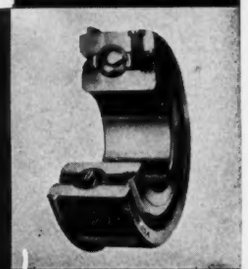

Double Row Self-Aligning Ball Bearing

Shielded Type Single Row Ball Bearing

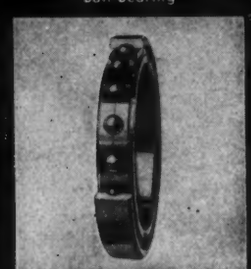

Single Felt Seal Ball Bearing

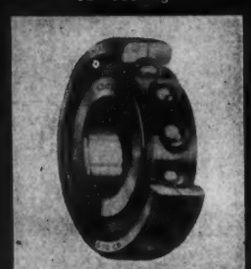

Double Felt Seal Ball Bearing

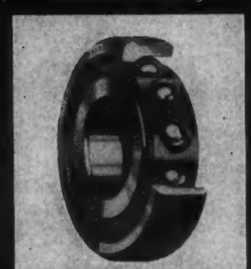

9000 Series (Feltless) Sealed Ball Bearing

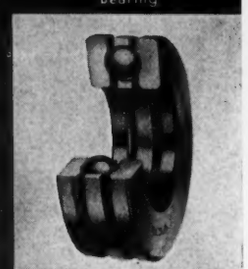

"Cartridge" Fully Sealed, Refillable Type Ball Bearing

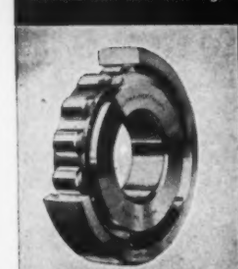
Double Row Ball Bearing


Extra Light Type Ball Bearing


Duplex Type (Two Direction) Angular Contact Ball Bearing


Angular Contact Ball Bearing

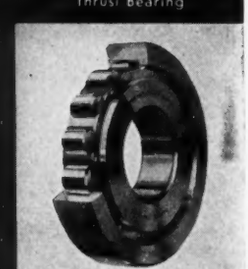

Single Direction Ball Thrust Bearing


Standard Cylindrical Roller Bearing

Double Row Self-Aligning Adapter Ball Bearing

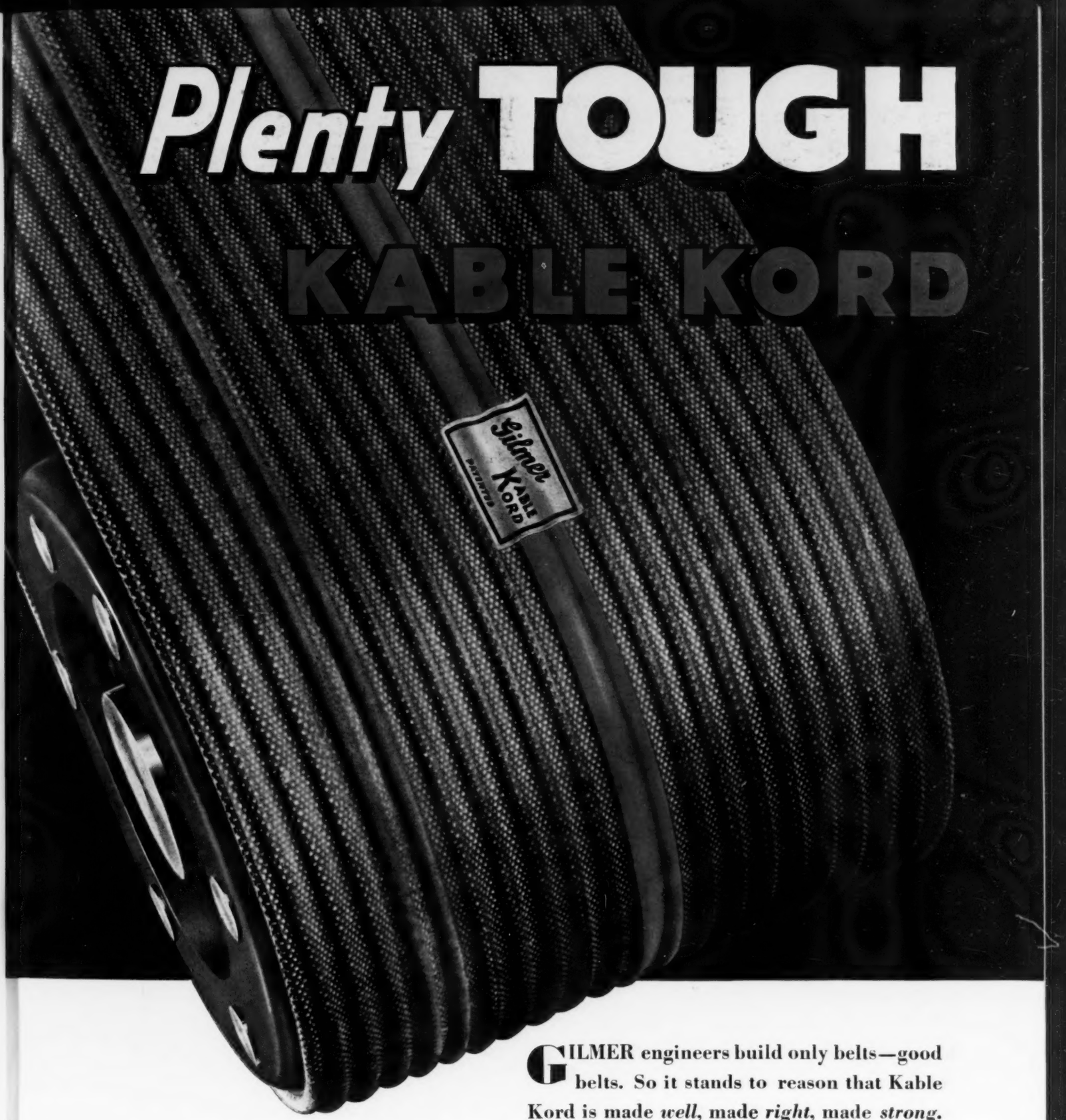
Full Type (Retainerless) Cylindrical Roller Bearing

Extra Light Cylindrical Roller Bearing


Two-Lipped Cylindrical Roller Bearing

Plenty TOUGH

KABLE KORD



GILMER engineers build only belts—good belts. So it stands to reason that Kable Kord is made *well*, made *right*, made *strong*. No other flat belt's like it—there's just one Kable Kord. It's a husky brute with a heavy hide that takes punishment and wears. Fact is, Kable Kord is a contactor belt *and* a power belt. Contactor cords force the pulling cords to hug flat pulleys with a no-slip grip that delivers maximum power per square-inch. Two-belts-in-one to do your jobs . . . Kable Kord boosts production and cuts down costs.

FREE Kable Cord Data Book. Money-saving facts about Kable Kord, endless or in rolls. Send for your copy today.

Gilmer BELTS

L. H. GILMER COMPANY, Tacony, Philadelphia

"THE OLDEST FIRM OF RUBBER FABRIC BELT SPECIALISTS"

5 reasons why Gilmer V-BELT GRIP GIVES POWER

1 TOP RUBBER—Tough, resilient tension rubber. A Gilmer flexes instantly to a perfect seat in the groove. Every Gilmer V-Belt is "tailor-made in the groove."

2 PULLING CORDS—Rubber-locked plies that concentrate great strength and power in a thin pulling section. Patented construction (only Gilmers have it) keeps these plies horizontal in multiple-drive operation.

3 BOTTOM RUBBER—Heat-resisting composition developed by Gilmer engineers. Supports pulling cords in permanent horizontal plane. Gives maximum crosswise rigidity. A Gilmer V-Belt never "squashes."

4 DOUBLE JACKET—Made of twin layers of bias-woven fabric with flexible rubber between. Triples the life of a V-belt; prevents worn spots at any one point; guards all working parts.

5 CONTROLLED STRETCH—Gilmer engineers *pre-test* every Gilmer V-Belt for stretch under full load. Insures permanent matched working lengths on multiple drives. Prevents "under-belting," unmatched loads. Stops power waste.

FREE

Gilmer V-Belt Catalogue. Your copy's ready.

Gilmer Single Strand V-Belts for fractional horsepower drives have the same *Gilmer Grip.*

L. H. GILMER COMPANY, Tacony, Philadelphia

"THE OLDEST FIRM OF RUBBER FABRIC BELT SPECIALISTS"

The chimneys smoke

. . . AND TUBIZE GROWS

There are three reasons why Tubize has grown—good rayon, personal service, and *you*.

Making good rayon is our biggest job. Tubize rayon today is better. During this past year, you know, Tubize has made acetate rayon. We have enlarged our facilities—installed much new equipment to make better viscose rayon, and more of it than Tubize ever could make before. Tubize now is fully prepared to move on with the advance of rayon.

Serving you well has made Tubize grow. Tubize service is personal service, built on personal knowledge of your rayon needs. Tubize men are all rayon men. They know rayon. They know you. It's the personal responsibility of every man in this organization to see that you always get the rayon you want—*as and when* you want it. To satisfy us, we must satisfy you. That is the way Tubize does things.

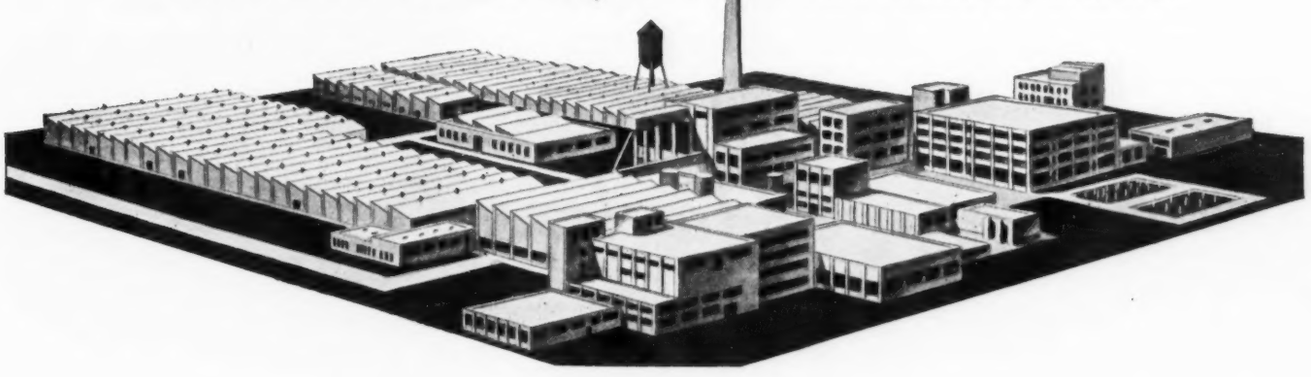
You keep Tubize busy. You keep us constantly on our toes. Our business is built on your business, your confidence. Please accept our whole-hearted thanks! . . . And remember: Tubize exists only to help solve *your* rayon problems.

The Makers of Charlonize Rayon

TUBIZE CHATILLON *Corporation*

TWO PARK AVENUE
NEW YORK CITY

Viscose and Acetate Rayon Yarns and Knitted Fabrics



$7,071 IN YEARLY COSTS WIPED OUT

Again Taylor completely engineered Automatic Slasher Control soon pays for itself . . . assures uniform finished goods

YEARLY, $390's worth of size materials—SAVED. Two hundred and sixty tons of coal, or $1,404—SAVED. One per cent of all cotton used, or $3,680—SAVED. A 1% increase in weave room efficiency, meaning $1,597 yearly—SAVED.

The total for all these savings is $7,071. And all are due to Taylor *Completely Engineered* Automatic Temperature Control in the slasher room.

These results are not unusual. In every mill where Taylor Automatic Temperature Control has been installed it has usually paid for itself in a matter of months, many times in less than a year!

In all cases, Taylor Control is designed for increased weave room efficiency and better hand and appearance in the cloth. In most cases (as in this one), a material cotton saving is made. Under manual operation, there is poor solid retention on the warp. This requires the use of slightly coarser yarn numbers in order to maintain cloth weights. Under Taylor automatic operation, with more uniform slashing, finer yarn numbers can be used. A saving in cotton naturally follows.

Your mill, too, can enjoy the money-saving—and money-making—advantages of Taylor *Completely Engineered* Automatic Temperature Control. Taylor textile engineers have successfully solved control problems for more than fifteen years. They bring this experience with them when they undertake a specific job for you. Just get in touch with a Taylor representative, or write Taylor Instrument Companies, Rochester, N. Y. Plant also in Toronto, Canada. Manufacturers in Great Britain—Short & Mason, Ltd., London, England.

Taylor

Indicating Recording Controlling

TEMPERATURE, PRESSURE, FLOW *and* **LEVEL INSTRUMENTS**

5 REASONS WHY

We call Taylor Automatic Temperature Control

"COMPLETELY ENGINEERED"

1. Taylor Textile Engineers survey your mill thoroughly.

2. They consider your installation an individual problem, recommending instruments and steam and size distribution to fit your specific needs.

3. Taylor Textile Engineers install complete systems to insure definite savings and profits.

4. They remain on the job to supervise the installation of every Taylor instrument.

5. Taylor Textile Engineers properly balance your slasher room operating conditions and help train your personnel in operating procedure to insure continuous efficiency.

AT THE HEART
of the Textile Industry

A long step forward was taken when Allis-Chalmers engineers, after exhaustive study, perfected the Allis-Chalmers Quick Clean Motor—designed specifically for the textile industry.

Plugging, fouling and overheating are no longer problems—maintenance costs go down quickly, wherever Quick Clean Motors are installed. Actually self-cleaning, these motors expel lint and dust as fast as they enter—allowing them no foothold . . . requiring no workman to remove them.

Exclusive Allis-Chalmers features make this possible: glass-smooth surfaces to which lint and dust can't cling; big, roomy air passages to let them out; working parts completely dust-sealed.

Allis-Chalmers Quick-Clean Motors come in four sizes—5, 7½, 10 and 17 hp. Standard N.E.M.A. mounting dimensions.

The Allis-Chalmers Manufacturing Company builds standard motors of every type from 1 hp. up—also motors for special application

864

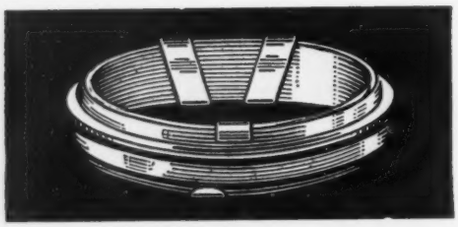
MOTOR DIVISION

ALLIS-CHALMERS

MILWAUKEE WISCONSIN

low cost is what counts most today..but you also want *Quality*

-here's how to get both in spinning and twisting smooth yarn



Above—BOWEN *Patented*

VERTICAL OFFSET TRAVELER

After exhaustive tests under actual running conditions, the Bowen Patented Vertical Offset Traveler has proved its worth in the twisting of cords and plys. Based on the true mechanical principle of taking a diagonal position with relation to the ring, presenting a bearing surface over the full width of the Traveler. This design prevents gripping or binding—gives an even tension—an evener rounded product—longer life to the traveler. Send for samples and prices.

High—NE-BOW *Patented*

VERTICAL RING TRAVELER

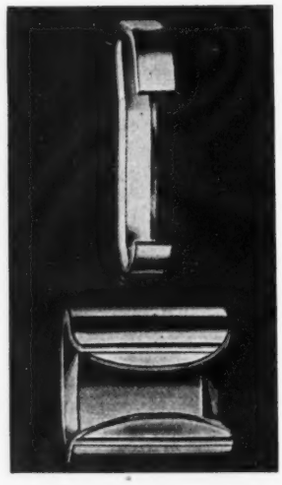
Developed to meet the particular needs of the silk and rayon trade in the process of throwing, due to the recent adoption of the vertical ring, particularly of the lubricating type.

By eliminating the pivoting action of the traveler, the traveler is at all times kept in close contact with the groove or device for lubricating the ring and assists in drawing therefrom the lubricant, distributing the same evenly over the entire inner surface of the ring; promoting a longer life to the traveler and a more even twist.

Right—BOWEN *Patented*

BEVEL EDGE

The Bowen Patented Bevel Edge feature of U. S. Ring Travelers produces ideally smooth, even yarn. There are no angular edges to flatten the end. There are no split ends in throwing rayon and silks—no fly waste in the spinning and twisting of cotton, wool, worsted, asbestos, kindred fibres. Made and stocked in all sizes and weights, for all kinds and counts of yarns.



This sealed Metal Shipping Container, protects you. On a par with the high quality of U. S. Products is the care we take to see that they reach you in perfect condition.

Sold under the trade names

- Bowen Round Point Travelers
- Bowen Square Point Travelers
- Bowen Improved Vertical Bronze
- Bowen Patented Bevel Edge
- Bowen Patented Ne-Bow Vertical
- Bowen Patented Vertical Offset
- Bowen Flat Oval and Round Wire Travelers

U. S. RING TRAVELER CO.

PROVIDENCE RHODE ISLAND

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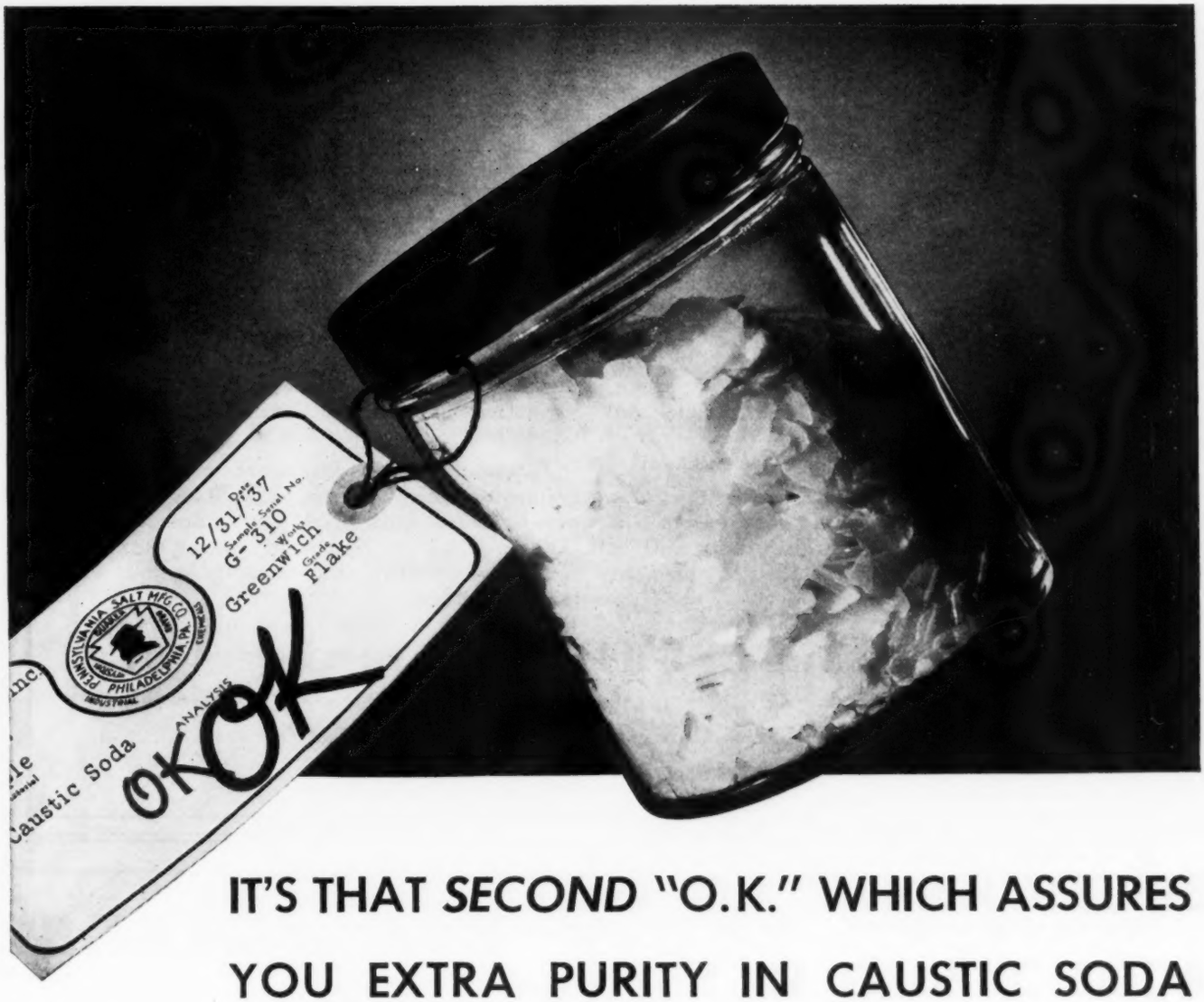
A Traveler for Every Fibre



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Working closely with cotton textile and rayon manufacturers, Pennsylvania Salt Manufacturing Company understands well the need for purity in the Caustic Soda you use. It is natural that we should take exceptional care to guard the purity of our product by setting a high manufacturing standard.

But that is only the beginning, for we have developed an additional process—a double purification—that results in electrolytic Caustic Soda low in salt content and extremely low in iron. When this product has received its second "O. K." you know that it will meet your most exacting requirements.

It is supplied in aqueous solution in 8,000 gallon tank cars as well as in solid, flake, or ground form in drums. Our technical staff is always ready to help in all problems of pumping, piping, and dissolving. Why not write us today, and let us discuss your problems?

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Textile Mills take

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From the purchase of yarns to the shipment of textiles you protect yourself against every conceivable risk — fire, theft, tornado, embezzlement, public liability. And then for 30, 60, or 90 days, your capital, in the form of goods, passes completely out of your hands — beyond your control, with no definite assurance of payment.

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V36

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each held in by a new construction which permits use of better-quality bristles at no increase in price. (Brush patented Sept. 20, 1937)

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All types of brushes. Established 1869 *"Hardy" brushes are hardy*

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Whether your problem
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the same manufacturing
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It has meant savings
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Signed .....

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Company .....

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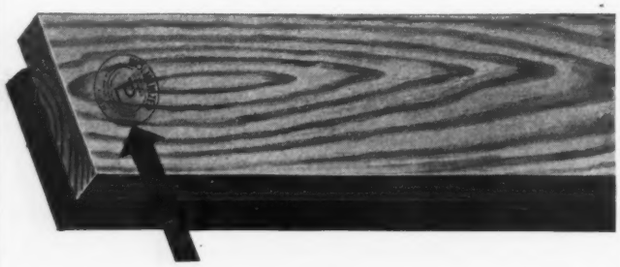

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Wolmanized Lumber is pressure-treated with Wolman Salts* preservative, which is mordanted into the wood like a fast dye. It won't leach out, it doesn't corrode metal. It leaves the wood clean, paintable and easy to handle. Painted Wolmanized Lumber is especially recommended for roofs.

Put Wolmanized Lumber wherever protection is needed: for roof decking, platform decks, floors and substructures. The extra cost is less than one average repair bill. Your regular supplier can furnish it. We will be glad to send you full information. AMERICAN LUMBER & TREATING CO., 1414 Old Colony Building, Chicago.

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This brand certifies correct treatment

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FOR ENDURING CONSTRUCTION

LATEST LOOM DEVELOPMENT

New and Amazing

The McCann and Stuer 5 Shuttle Mix Single Pick Automatic Loom Attachment.

With Perfect Protections Preventing Bad Doffs, Breakages, Cloth Smashes and Runners or Side Liners Getting Into Cloth.

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No Locking of Boxes Required.

No Cams, Gears and Cross Shafts Used.

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Made for Both Equal or 2 in 1 Geared Looms.

Fits on Drive End of Loom, Whether Right or Left Hand Drive. Keeping Head Motion Free of Encumbrances.

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The Simplest and Most Economical to Operate.

Flexibility. 15 Minutes from Automatic to Hand Shuttle and Back Again to Automatic in Same Time. No Settings Disturbed.

Weaves Better Cloth and Mixes Filling Better Than Hand Fed Looms.

For Demonstration of Same Weaving Cloth Apply to Sole Maker

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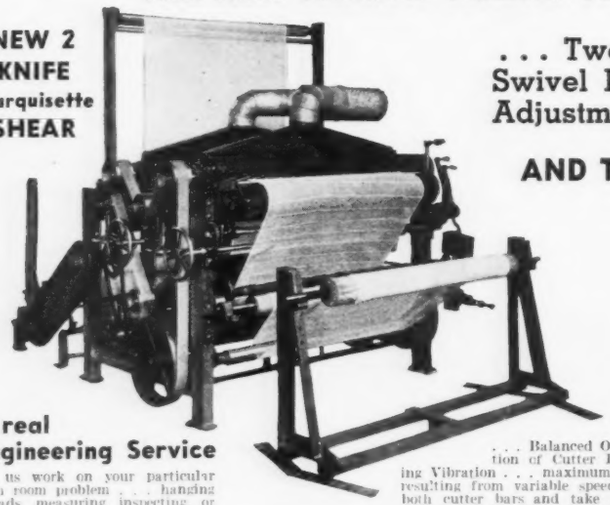

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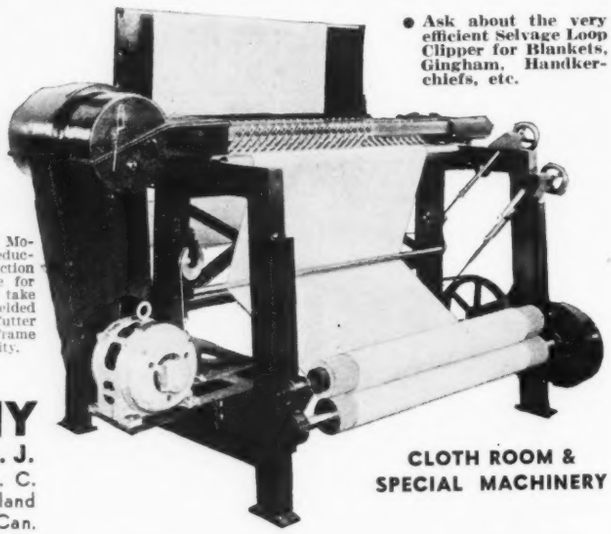

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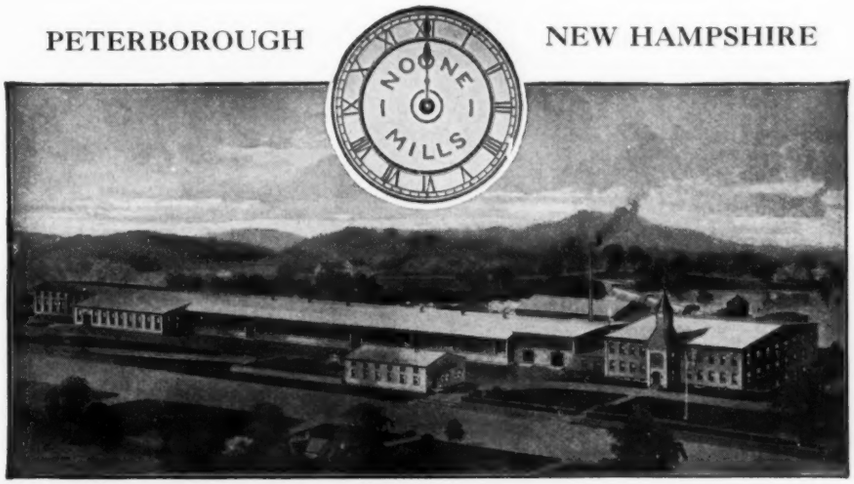

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Use Noone's Roller Cloth and be assured of a Strong Round uniform yarn, the best obtainable. Eventual cost, less than any other covering.

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Write us regarding all matters pertaining to bobbin holders, as we make many kinds, and are sure we can be of help to you.

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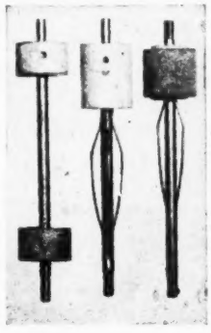

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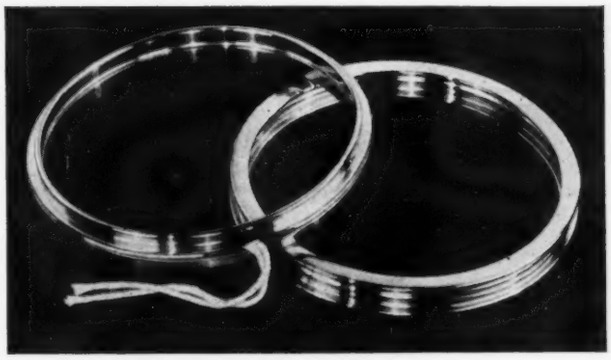

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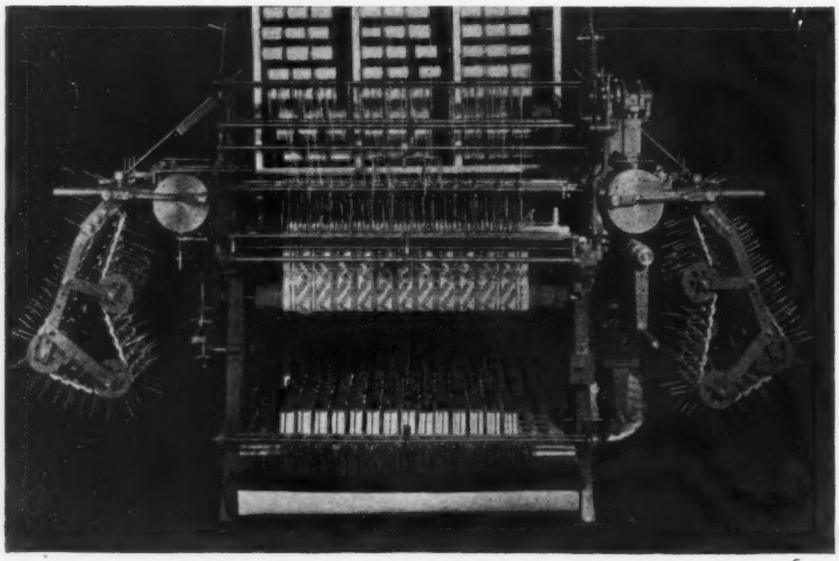

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BETTER WEAVING—produces a better quality mesh because of specially designed cams and other exclusive features.

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REDUCED COSTS—returns definitely higher output of quality net with less waste and lower operating costs.

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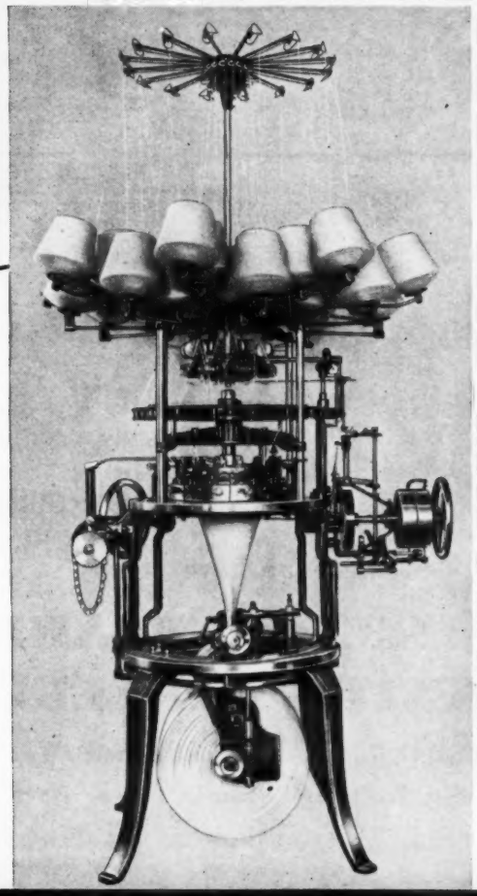
WILDMAN MULTIPLE FEED RIB MACHINE

This amazingly efficient Wildman Multiple Feed Rib Machine offers—"radical improvements and advances in mechanism that mean higher production and better fabric, as well as perfect trouble-free operation. These establish the Wildman Multiple Feed Rib Machine as a distinctly new departure in underwear knitting. This 16 feed machine means virtually 100% greater production than an 8 feed machine; with the capital investment only 30% higher."



• Additional information furnished on request.

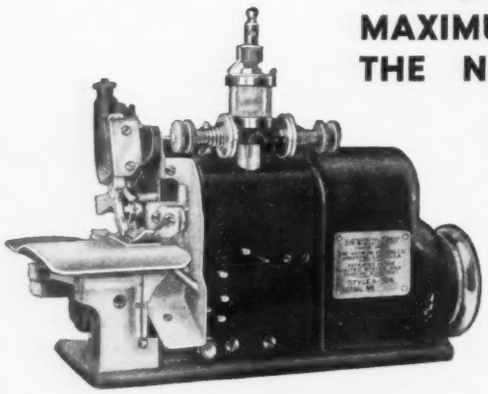
WILDMAN
THE WORLD'S STANDARD

WILDMAN MANUFACTURING CO.

NORRISTOWN, PA.

1838 TRADE MARK MERROW REG. U. S. PAT. OFF. AND IN FOREIGN COUNTRIES 1938

FOR OVERSEAMING AND OVEREDGING WITH MAXIMUM EFFICIENCY — MODERNIZE WITH THE NEW MERROW CLASS A MACHINES



The result of several generations of specialized effort in the industrial sewing machine field—combining quality production with high speed and low operating cost to a greater degree than ever before.

WRITE FOR DETAILS AND LET US DEMONSTRATE THESE MACHINES ON YOUR OWN FABRICS.

ALSO PLAIN CROCHET AND SHELL STITCH MODELS FOR ORNAMENTAL EDGE FINISHING AND CLASS 60 MACHINES FOR BUTT SEAMING

200 VARIETIES FOR 200 PURPOSES

THE MERROW MACHINE COMPANY

14 LAUREL STREET, HARTFORD, CONN., U. S. A.

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This Month—

A fast growing business . . . ladies' and men's knitted coatings. May we give you some of the reasons why?

TOMPKINS BROS. CO.

Circular Spring and Latch Needle Knitting Machinery

Since 1846 Syracuse, N. Y.

THE LOYAL T. IVES COMPANY

ESTABLISHED 1874

NEW BRUNSWICK NEW JERSEY

Manufacturers of

SPRING BEARD KNITTING NEEDLES

For Cylinder, Full Fashioned, Warp and Rib Knitting Frames, also Narrowing, Stand, Transfer Points, and Welt Hooks for Full Fashioned Machines; Slides, Sinkers, Jacks, Guides or Flat Eyes, Sley and Milanese Points, Transfer Points or Quills, etc.

Sheet Metal Specialties to Order

meet competition

NEW

WITH

BRINTONS

This new BRINTON is the first to produce jacquard-type patterns, on both face and back of rib fabrics. But, where reversible fabrics are not required, the pattern can be produced, on either the cylinder or the dial — producing fabrics particularly adaptable for bathing suit materials, such as Welt-Stitch, Blister-Stitch and Mesh-Stitch.

Investigate the new BRINTON — PR (pattern rib) machine — without obligation.

CIRCULAR KNITTING MACHINES

BRINTON

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PHILADELPHIA, PA.

New York Office: 1270 Broadway

BETTER "SEEING" ON THE JOB

FLEXIBLE fostoria LOCALITE

NEW CANOPY LOCALITE *Increases* **WORKER'S EFFICIENCY**

High Intensity Glareless Lighting Units Installed at Low Cost . . .

Clear illumination, without glare, over large working areas is obtained by the modern design of Fostoria Canopy type Localites. Wherever good seeing on a worker's task is essential to accuracy, speed and freedom from eye fatigue, Fostoria saves time, waste and money. Installation cost is surprisingly low. Production improvement is immediately apparent. We invite your test . . . . A complete variety of Localite models are available for specific applications. Write for information, today.

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DESCRIPTIVE BROCHURE FREE . . A valuable handbook of localized lighting.

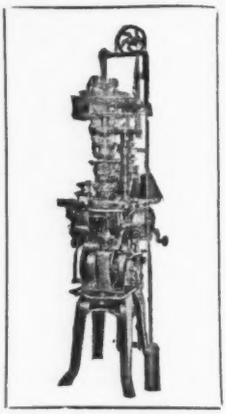
Acme Products

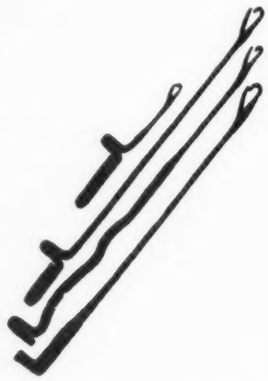
for seamless hosiery knitting

Speak for Themselves

Machines *up-to-date*

Needles *Economy makers*





ACME KNITTING MACHINE & NEEDLE CO.

FRANKLIN, N. H.

FOR LONG LIFE . . .

"Angle Steel" EQUIPMENT

There is "Angle Steel" and sheet metal equipment designed and built specifically for Textile Mills.

Cut shows latest Bar Topping Table. Incorporates improvements suggested by experienced Knitting Mill men. Size 24"x24"x30½" high. Right or left hand patterns. Set up and crated.

Write for circular illustrating and describing Knitters Cabinets, Matching and Pairing Tables, Hosiery Racks, Knitters Examining Tables, Knitters Boxes, etc.

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330 West Street Plainwell, Mich.

Needles

for all types of Knitting Machines

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Jasper-Groz Needle Co., Inc.

71 MURRAY ST., NEW YORK, N. Y.

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ATTENTION! ALL FULL-FASHIONED HOSIERY MILLS!

Don't throw away your worn parts.
Send them to us to be reconditioned.
We build up the wearing surface of all cams with special **wear resisting** material and grind to the profile of your Master.
We recondition rollers and sprockets with our special LONG LIFE TIRES.
We replace gear teeth—recondition bearings, etc., etc.
We specialize in reconditioning all wearing parts on Full-Fashioned Knitting Machines.
Improve your product by keeping your machinery in proper condition.

PARTS RECONDITIONED BY US WILL OUTWEAR NEW PARTS!

THOMAS & SKINNER STEEL PRODUCTS CO.,
1119 E. 23rd Street, Indianapolis, Ind.

FRANKLIN MACHINE CO.

Engineers — Founders — Machinists

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Ball Winding Machines
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Corliss Steam Engines
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Shoe Lace Tipping Machines for Metal and Celluloid
Machinery for Dyeing Rayon in the Skein
Package Dyeing Machinery

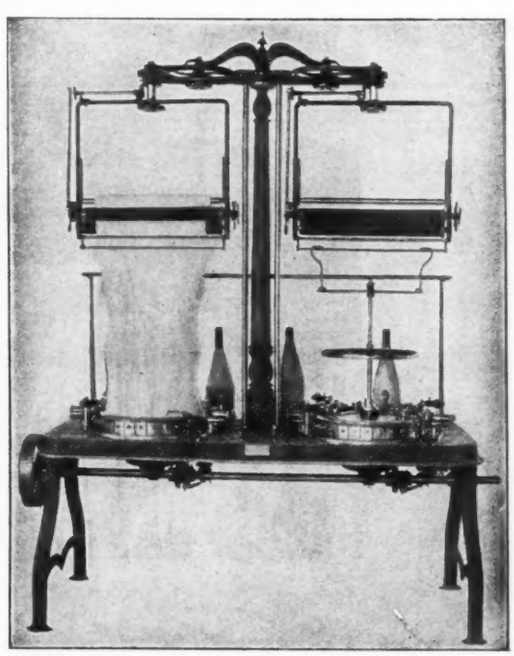
CRANE REPUTATION

made in the Knitting Field years ago is maintained TODAY . . .

Behind every modern detail of Crane Equipment lie 50 years of specialization in the field of Knitting Machinery. Crane superiority is the result of close cooperation with actual knitters, a close study of real problems in actual mills, and an ability to produce exactly the machines to meet all demands.

CRANE features are the result of long experience with knitters and their problems

Crane outstanding features include patent thread – stop motions; and removable, hardened wing burr wheels. These and other Crane features are your guarantee of high speed, low cost production and freedom from costly and troublesome stops. Upon request we will be glad to have a representative call and outline just what Crane has accomplished in the knitting field, and to suggest how the use of Crane Equipment can increase quality output and versatility and reduce production costs in your mill– ***WRITE!***



Our Spring Needle Underwear Machine with Automatic Take-up is shown here. This machine is made in sizes from 10 in. to 36 in. in diameter for the production of a great variety of fabrics of any desired gauge, the number of feeds depending on the size of the cylinders. Aside from the feeds for plain fabrics the stockinet, eiderdown and astrachan feeds are superior to any on the market.

We also build improved Automatic 3-Colored Plain Stripers. Made in sizes from 7⅝ in. to 20⅝ in. inclusive, of any desired gauge; these measurements being back to back of cylinder needles. The fabrics from this machine are used for bathing suits, theatricals and athletic goods. These machines are second to none on the market. The Crawford stop-motion is applied when requested.

CRANE MANUFACTURING COMPANY

LAKEPORT, N. H.

CRANE spring and latch needle KNITTING MACHINERY

Two Hundred Years Ago - - - *Charles Maria Lacondamine*, great French naturalist, reporting to the French Academy on his discoveries in Ecuador, told of the use of *latex* by the natives in manufacturing shoes, bottles, waterproof clothing and other objects.

Today - - - Latex finds increasing application in its original field—the Textile Industry. The haphazard methods of another day have given way to modern, scientific methods of stabilizing and compounding latex, that assures of a finished product which embodies all the qualities of *live* rubber at a cost which is economical.

Write today for information on the use of REVERTEX—the concentrated Rubber Latex—in COMBINING, SPREADING, IMPREGNATION and many other uses.

REVERTEX CORPORATION OF AMERICA
80 BROAD STREET *NEW YORK, N. Y.*

Brighter Whites
Lower Costs
Superior
Tensile Strength

By Kier Boiling with Compounds Containing

YARMOR 302*

Gray goods kier boiled with compounds containing Yarmor 302 Steam-distilled Pine Oil are bright, white, and soft of texture.

The use of these compounds shortens the kier-boiling time, which helps to reduce production costs.

Compounds containing Yarmor 302 decrease losses, but when they are employed there is less loss in tensile strength.

The coupon will bring you further information about the value of Yarmor 302 in compounds for kier boiling.

Please send information about the value of Yarmor 302 in kier compounds.

*Reg. U. S. Pat. Off. by Hercules Powder Company

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HERCULES POWDER COMPANY
Incorporated

994 Market Street
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Branch Offices:
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HERCULES POWDER COMPANY, 994 Market Street, Wilmington, Delaware

Please send information about the value of Yarmor 302 in kier compounds.

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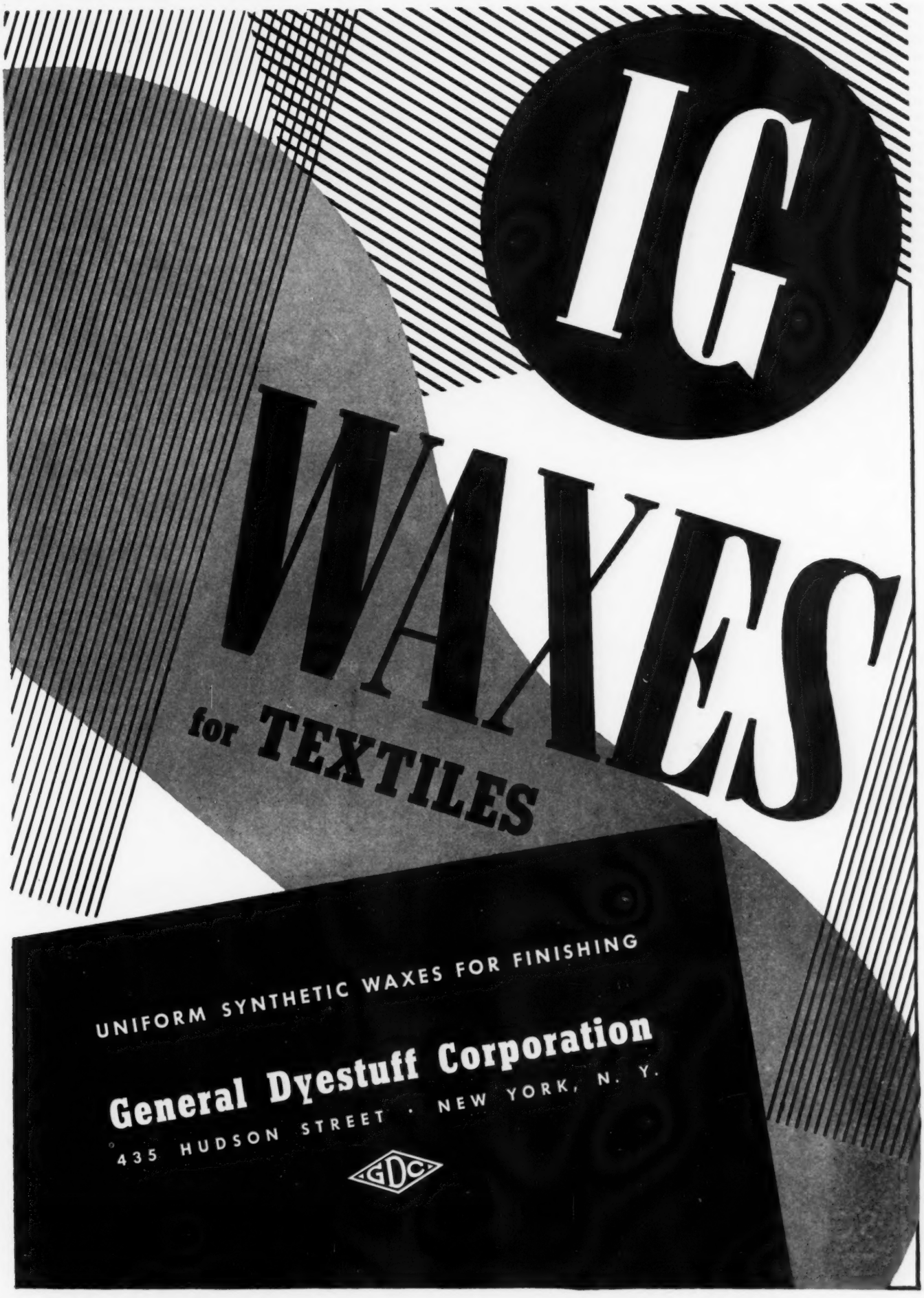
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for TEXTILES
UNIFORM SYNTHETIC WAXES FOR FINISHING
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435 HUDSON STREET · NEW YORK, N. Y.
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THE NAME THAT'S NEWS!

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Continued on Page 6, Column 5

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Mills Gain Extra Sales for Extra Hosiery Value

Alert hosiery manufacturers are reaping profits from *DuraBond* finishing. Specifically made for the specific fabric, *DuraBond* imparts the multiple advantages of dull, soft texture; splash proofing; snag and run resistance, added wear and added clarity that makes every pair look a thread more sheer.

Snags and pulls in handling are less; losses are minimized by the *DuraBond* "film of protection."

(A sales point to the retailer, too. His handling losses are equally lessened.)

EXCLUSIVE PRODUCT

DuraBond Hosiery Finishes are made only by Scholler—are used on more than 75 percent of all quality brands today

Experienced men are always at the service of the trade in *fitting the finish to the individual fabric.*

Removal of members of administrative tribunals in Federal and State governments, such as the Interstate Commerce Commission and...

dependent, then members of these commissions should also have freedom from political environment," he said. "The ... Commissioner ... should ...

SCHOLLER BROS. INC.

MANUFACTURERS OF TEXTILE SOAPS, SOFTENERS, OILS, FINISHES

COLLINS & WESTMORELAND STS., Phila., Pa. • ST. CATHARINES, Ontario, Canada

SOLVAY
TRADE MARK REG. U. S. PAT. OFF.
for
TEXTILE
SODA

Solvay Textile Soda is ideal for wool scouring, and cotton and wool finishing. You can count on its meeting every requirement of textile operation because it is a mild, specially prepared soda of highest purity and quality.

for
CAUSTIC
SODA

SOLID - GROUND - FLAKE - LIQUID

For full strength and effective action, ask for SOLVAY Caustic Soda. Every step in its manufacture is scientifically controlled to insure highest standards.

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Calcium Chloride • Causticized Ash • Caustic Potash
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Alkalies and Chemical Products Manufactured by The Solvay Process Company

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ANNOUNCING

SOMETHING NEW IN WARP SIZING

DRY

AHCO SIZE

FOR BETTER WEAVING . . A NEW *SYNTHETIC WARP SIZING IN DRY FORM

*PATENT APPLIED FOR

ADVANTAGES:

1. MAKES BETTER WARPS
   (a.) Less Shedding (b.) No Foaming
2. COSTS LESS TO USE
   (a.) Highly concentrated (Less required)
   (b.) Lower Transportation Costs
   (c.) No Waste (Clean Floors, Pipes and Kettles)
3. EASY TO HANDLE
   (a.) Dry Form (b.) Convenient Packages

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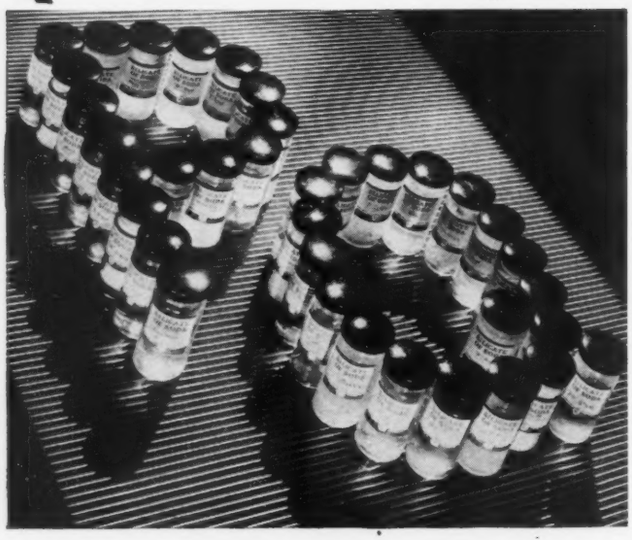
Arnold-Hoffman & Company, Inc.

Established 1815 . . . Plant at Dighton, Mass.

PROVIDENCE, RHODE ISLAND

NEW YORK BOSTON PHILADELPHIA CHARLOTTE

IT PAYS to watch these P's & Q's



P.Q. SILICATES OF SODA can make or save you money. In the various textile processes the most frequent advantage of using P.Q. Silicates is the improvement in quality. Often they also reduce cost.

Are you familiar with the use of P.Q. Silicates in your mills in the following applications?

Bleaching: The even release of oxygen with Star Brand reduces waste. Whites are cleaner and clearer, and have a better "hand".

Scouring: Rayons (other than acetates) are scoured safely with Metso. Metso removes all dirt, leaving the goods clean and ready for bleaching and dyeing.

Kier Assistant: Metso hastens the wetting and assists in better mote removal. Many mills report bleach savings.

There are other ways by which you can profit from P.Q. Silicates, described in Bulletin 178; free on request.

ESTABLISHED 1831

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General Offices and Laboratory: 125 S. Third St., Phila., Pa.
Chicago Sales Office: 205 W. Wacker Drive. Stocks in 60 cities.
Sold in Canada by NATIONAL SILICATES LTD., Toronto, Ont.

SILICATE OF SODA

Uniform
Dependable
Quality

VICTOR MILL STARCH

"The Weaver's Friend"

- BOILS THIN
- HAS MORE PENETRATION
- CARRIES WEIGHT INTO THE FABRIC

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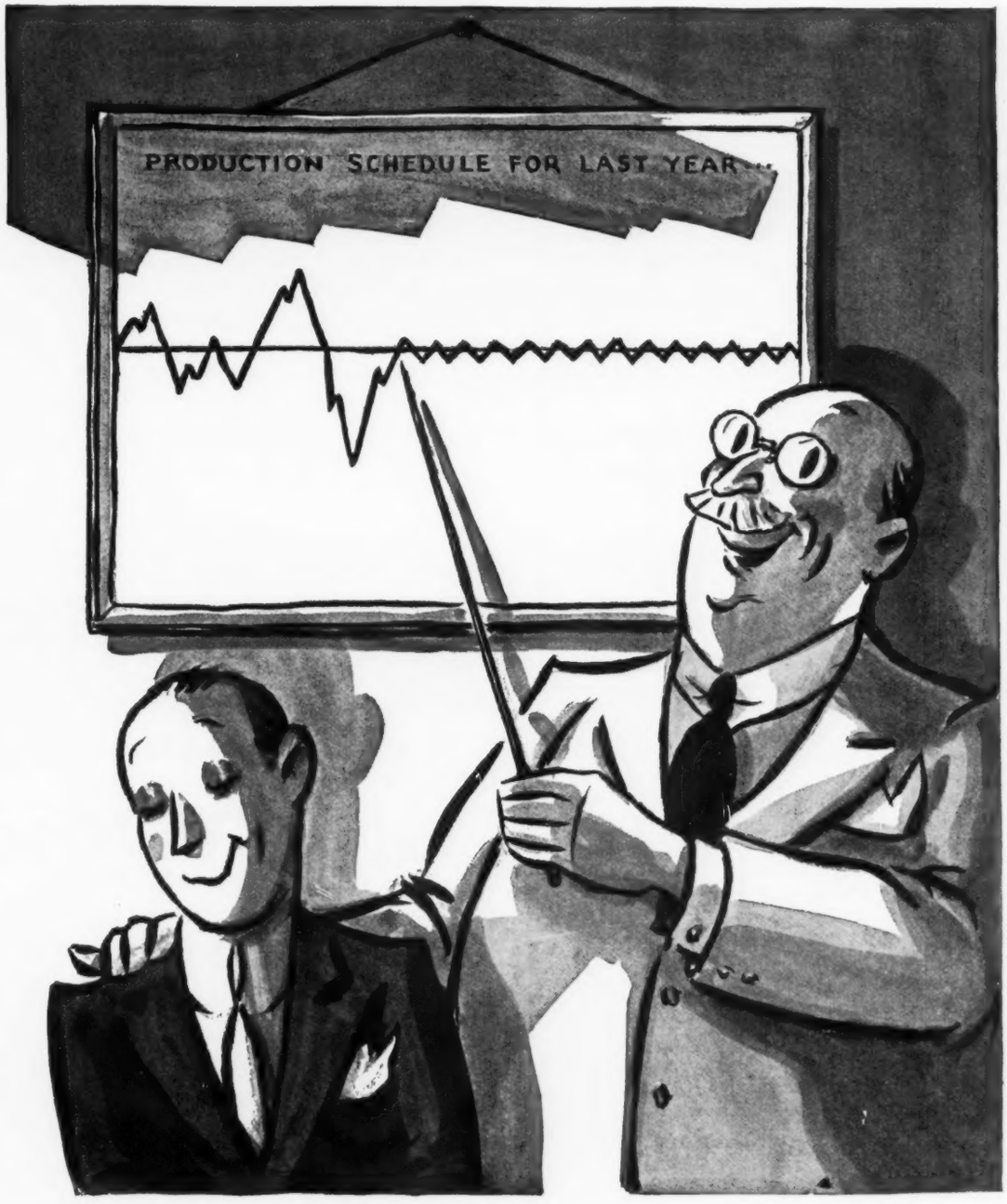

"It was at about this point, gentlemen, that our Mr. Smedley suggested using

Niagara Caustic Potash"

P.S. May we suggest that you use Niagara Caustic Soda and Carbonate of Potash, too?

Niagara
ALKALI COMPANY
42nd STREET, NEW YORK, N. Y.
Associated with Electro Bleaching Gas Co.
Pioneer Manufacturer of Liquid Chlorine

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50% and 75% STRENGTHS

A sparkling, crystal clear liquid whose purity has established a new high standard never attained heretofore in the commercial product.

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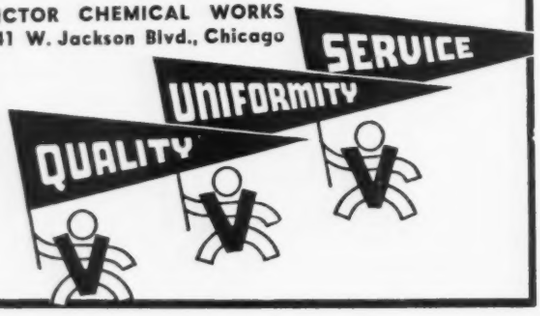

Stopped Spoilage

BY CLEANING
DYE VAT VENTILATORS
THE **OAKITE** WAY

TRY as they would with their old way of cleaning, one mill couldn't keep ventilators over dye vats free from slime accumulations. The situation was serious, for the drip from the slime ruined many yards of goods in process.

Then steam cleaning with a solution of the recommended Oakite material was tried. Now, every trace of slime is removed so thoroughly that ventilators are always kept clean and spoilage is ended.

Have *you* a troublesome job to put up to Oakite cleaning? Write, no obligation.

Manufactured only by
OAKITE PRODUCTS, INC., 42 Thames St., NEW YORK, N. Y.
Branch Offices and Representatives in All Principal Cities of the United States

OAKITE *Certified* **CLEANING**
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

LIQUID LATEX

Normal and Concentrated

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Agents in U. S. A. for Dunlop Concentrated 60% Latex, product of Dunlop Plantations, Ltd.

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Kydo **MOTH** Process

Neither Harshens Nor Injures Fibres
Reasonably Priced and Effectual

KYDO MOTHPROOFING CORPORATION
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NOW OFFERING 1938 PRODUCTION

DOMESTIC DRIED EGG

Only Grade A Eggs Processed
FLAKE WHOLE EGG
SPRAY YOLK AND SPRAY ALBUMEN
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Write for Samples and Prices

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1170 BROADWAY, NEW YORK, N. Y.
LARGEST EGG DRIERS IN AMERICA

SEARCHLIGHT SECTION
TEXTILE WORLD ANNUAL

FEBRUARY, 1938

WHERE-TO-BUY

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PLANT AND MAINTENANCE SHOP EQUIPMENT

POWER GENERATING EQUIPMENT—ELECTRIC MOTORS

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Bleaching, Dyeing and Finishing Machinery Page

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Marshall's Inc. 187
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Green-McCord Corp., Edwin Farnham 178
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51 Madison Ave., N.Y.C.
Standard Mill Supply Co. 183
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(See Plant and Maintenance Shop)

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Ambler Textile Machinery Co. 184
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Bradford, Roy H. 186
161 Devonshire St., Boston, Mass.
Fyans, A. F. 185
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Machinery Liquidating Co., Inc. 179
33 W. 42nd St., N. Y. C.
Paterson Silk Machinery Ex., Inc. 187
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Sewing Machinery

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Silk Machinery

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161 Devonshire St., Boston, Mass.
Machinery Liquidating Co., Inc. 179
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Paterson Silk Machinery Ex., Inc. 187
22 Spruce St., Paterson, N. J.

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Stephenson, Harry 182
River Work, Andover, Mass.
Wheeler, Frank W. 182
1835 E. Ruan St., Philadelphia, Pa.

Textile Machinery (General)

Cady, A. J. 184
P. O. Box 522, Troy, N. Y.
Horton, Harold W. 185
49 Westminster St., Providence, R. I.
Industrial Plants Corp. 184
90 West Broadway, N. Y. C.
Langevin, George F. 184
Sun Bldg., Lowell, Mass.
Standard Mill Supply Co. 183
1064-1090 Main St., Pawtucket, R. I.

EMPLOYMENT and other "OPPORTUNITY" advertising—see page 188

2 ANNOUNCEMENTS

1 – Purchase of the C. S. DODGE CO. Est. 1883

67 Payne Street, Lowell, Mass.

To be operated as a division of the FRANK G. W. McKITTRICK CO.

Raymond W. McKittrick, Manager *Charles S. Dodge, Superintendent*

Manufacturers of

English Standard Big Ben Pickers "Dodge Made"
Dodge Rag or Shoddy Pickers
Dodge Lumpers
Dodge Wool Bagging Machines
Dodge Square Picker Pins
Dodge Picker Cylinders, Lags, Pins and Parts

REBUILDING AND RECONDITIONING
RELAGGING CYLINDERS

For information, quotations, estimates and service write, wire or phone
C. S. Dodge Company, 67 Payne St., Lowell, Mass., Telephone: Lowell, 1340

2 – REVISED PARTIAL LIST

In stock at the following warehouses:
64 Fletcher St., 324 Jackson Street, 360 Jackson Street, Lowell, Mass.

PICKERS—Send for List of Feeds

1—D&F 48" Mixing Picker
1—D&F 48" Fearnaught Picker
1—C. S. Dodge #4 Rag Picker
2—C. G. Sargent 48" Multiplex Burr Picker
1—C. G. Sargent 36" Duplex
1—C.&M. Parkhurst 48" Burr Picker
1—Atlas Parkhurst 48" Burr Picker
1—C&M 36" Fearnaught

CARDING—WOOL

4—D&F 3 Cyl. 48" face x 60" dia. Bramwell Feed. Garnet Breast, Rubb Condenser. All iron construction. Clothed.
3—D&F Double Finishers 48" face x 60" diameter with Rubb Condensers. All iron. Clothed.
1—D&F Single Breaker 60x60 with Bramwell feed, Garnet Breast. All iron.
2—D&F Single Breakers 60" face x 48" dia. with Bramwell feed. Garnet Breast. All iron. Clothed.
2—D&F #21 Garnet Breasts for 60" cards.
2—Bramwell Card Feeds 60".
3—Bramwell Card Feeds 48"—Rebuilt
2—D&F #31 Garnet Breasts for 48" Cards
2—R-H 60" Floor Grinders
1—B. S. Roy 60" Floor Grinders
1—B. S. Roy 48" Floor Grinders
800—Card Spools Fibre Head 59½"x8
1—D&F 60" Tape Condenser 2 Bank for 48 ends.

MULES—WOOL

2—J&B 280 spdl. x 2¾" ga. Hi-Speed Heavy Duty 9½" Bobbin

LOOMS—LOOM BEAMS—Etc.

6—C&K 82" Hvy. Type 25 Harness. 4x4 Box Belt Drive
2—C&K 82" Hvy. Type 30 Harness. 4x4 Box Belt Drive
200—Loom Beams 82"x6⅝" bbl. for C&K Looms
158—Loom Beams 92"x6⅝" bbl. for C&K Looms
3000—Bars C&K Box Chain
4000—Bars C&K Harness Chain 20, 25, 26, and 30
102—Harness Frames 87"x14" Heddles
1350—Harness Frames 43"x12" Heddles
278—Harness Frames 87½"x14" Heddles
113—Harness Frames 75"x14" Heddles
204—Harness Frames 70"x14" Iron End
155—Veeder Root Day and Night Pick Counters

FINISHING

1—P&W 66½" Dble Shear Model "A". List Savers
1—C&M 66"x2 Cyl. Dble. Acting Brushing Mach. with Steam Box
1—Windle #4 Doubling-Winding-Measuring Mach. for 60" Cloth
1—P&W 65" A.W.C. type measuring mach.
1—D&F 72"x24 Roll D.A. Napper
1—Gessner 66"x15 Cyl. Hi-Production Dble. Bed Rotary Press
3—Inspection Perches 72" with 60 yd. Clocks
1—Inspection Perches 80" with 100 yd. Clock
2—Tillotson Hand Perches 72" Adjustable
7—Walsh & Houston; and Houston Rotary Sewing Machines
3—Wilcox & Gibbs Sewing Mchs. for overedging blankets—Rebuilt
1—Metropolitan Style 26AT1 for overedging—Rebuilt
1—each; Merrow Sewing Mchs Style 60U and 60UD
1—Singer Numbering Machine Head

EXTRACTORS

1—King & Gerber 60" Motor Driven
1—Broadbent 60" Copper basket. Underneath Belt Drive
1—Tolhurst 40" Lead Lined. Overhead Belt Drive

FOSTER WINDERS—DOUBLERS

3 —Foster Model 101 Cone Winders 80 Spdl. x 6" tr.
1 —Foster Model 12 Tube Winder 80 Spdl. x 6" tr.
2 —Foster Model 25 Doublers 100 spdl. x 6" tr.

DIVISIONS
C. S. Dodge Co., Est. 1883
Rag or Shoddy Picker Mfrs.
★ ★ ★
John A. Thomson Co., Est. 1901
Hardware and Mill Supplies

EST. 1922

APPRAISALS • •
FRANK G. W.
B. A. McKittrick, Pres.
Frank G. W.
USED WOOLEN AND
60-64 Fletcher Street

by the FRANK G. W. McKITTRICK CO.

C. S. Dodge, Established 1883, for purpose of manufacturing Dodge Patent Hot Forged Square Picker Pins. Expanded in 1884 to make C. S. Dodge Rag or Shoddy Pickers and soon added other items, including Dodge Wool Bagging Machines, Dodge Lumpers, as well as expanding the pin department to make all styles of Picker Pins.

Mr. Charles S. Dodge, the founder, was the father of the present Charles Dodge, who started with the firm in 1884, being associated with his father until the latter's death on August 22, 1914, and then continuing the business alone until now, so that he will have completed 54 years service with the firm next June.

Wishing to retire from the combined burden of sole ownership and management, and to insure the continuance of the business Mr. Dodge has sold his business to the Frank G. W. McKittrick Co. to be continued as the C. S. Dodge Co.

Mr. Dodge will remain with the C. S. Dodge Co. in an executive capacity, and his 54 years experience are at your service.

Inventories will be built up as fast as they can be manufactured. A new enlarged stockroom is being installed with complete stock of parts for Dodge Pickers, Bagging Machines, Lumpers, and English Standard Big Ben Pickers.

A modernization program has been laid out for the entire plant, including an expansion of the rebuilding and reconditioning department.

SERVICE and PROMPT SHIPMENTS are to be stressed at all times.

Since 1883, the Dodges, father and son, have always tried to put the best of materials and workmanship into their products. It is our aim, not only to maintain these standards, but constantly try to improve them.

DODGE SQUARE PICKER PINS—STANDARD SINCE 1883

OF EQUIPMENT FOR SALE

Frank G. W. McKittrick Co.—Telephone Lowell 445—B. A. McKittrick, Sales Mgr.

1 —Foster Model 25 Doublers 50 spdl. x 6" tr.
271 —Foster Wood tube arms and spdls. Model 12
450M—New Papercones—Foster Nu-Taper
5M—Wood tubes 6⅞x1 1/16

UNIVERSAL WINDERS

5—Uni #90x20 spdlsx8" bobbin. Bunch Bldrs. Serial #41,900
2—Uni #50 6 spdls x 11" p. tube Winders.
22—Franklin Spring Spdls for #50 Winders

JACKSPOOLERS—SPOOLS

2—Wor. Warp. 6 drum Multiple Spoolers 32¾" 40 ends
2—Sets 6 Drums each for above 48 ends
1—D&F Sgl. 50" Jackspooler—Like new. 48 ends
1—D&F Sgl. 41" Jackspooler 40 and 48 ends
1—D&F Sgl. 40" Jackspooler 48 ends
2—D&F Sgl. 33½" Jackspooler 40 and 48 ends
1—each Multiple Spooler Creel 240, 252, 288, 306 ends
Jackspools—Send size wanted.

SPINNING—WORSTED

10—H&S. 180 x 3¾"p. x 5 ft. Frames
6—H&S. 200 x 3½"p. x 5 ft. Frames 1919
6—S-L 200 x 3½"p. x 5 ft. Frames 1917
4—H&S. 144 x 3½"p. x 5 ft. Frames. Used very little
1—S-L 160 x 3½"p. x 5 ft. Frames 1922
5—S-L Hvy. Dble. Bldrs. for 5 ft. frame
1—Sample frame 32 x 3½"p x 5 ft. Caps—tubes—spdls.—top front rolls—parts—bobbins, etc.

TWISTING—WORSTED

5—S-L #1 Ring Changeovers for 160 spdl. x 3½"p. frames—NEVER USED
10—S-L 200 spdl. x 3½"p. x 5 ft. Cap Trap. 1918-20
3—H&S 192 x 3½"p. x 5 ft. Cap Trap.
9—H&S 168 x 4"p. x 5 ft. Cap trap (will change to 3" Ring)
1—PS 160 x 3½"p. x 5 ft. x 2½" Ring Dolly Roll type
Caps—tubes—spdls.—parts—bobbins, etc.

DRAWING—WORSTED

1—P.S. 12 spdl. x 9¼"p.—12x6
1—S-L 10 spdl. x 9¼"p.—12x6
1—H&S 12 spdl. x 9¼" p.—10x6
2—S-L 8 spdl. x 9¼" p.—11x6
8—P.S. 12 spdl. x 8" p.—10x5
3—H&S 4 spdl. x 12½" p.—14x9
2—P.S. 4 spdl. x 12⅜" p.—14x9
Will have more heavy drawing soon. Send List of Mchs. wanted.

ROVING—WSTD.—REDUCING

6—S-L 36 x 5½" p. 6x3½ Spool Rabbeth Spdls
12—LMS 36 x 5½" p. 6x3½ Spool Rabbeth Spdls
4—H&S 32 x 5½" p. 6x3½ Spool
1—H&S 24 x 6" p. 4x8 Flyer Rover
1—P.S. 16 x 7¼" p. 9x5 Flyer Reducer
1—H&S 16 x 7¼" p. 9x5 Flyer Reducer
1—H&S 24 x 7¼" p. 9x5 Flyer Reducer
1—S-L 12 x 7¼" p. 9x5 RING Reducer
4—H.S. 24 x 6" p. 4x8 Ring Rovers
Spools—Parts—etc.

GILLING

62—Gill Boxes in stock
1—H&S SAMPLE GILL BOX
Send for Lists of Kinds wanted.

FIBRE CANS—TRUCKS

52—NEW 14x24 Fibre Seamless
394—Seamed 11x36
202—Seamed 10x36
52—Seamed 12x36
142—Seamless 6x32½
857—Seamless 7x32½
15—Square Dble. 12x18x36 Cans
40—Metal Clad Fibre Trucks 38x19½Wx 29D

MISCELLANEOUS

2—Yorkshire Sgl. Bowl Crabs 72"
1—Emerson 4 Basket Top Testing Oven 110 V.
1—Set Dry Cans 19 copper & 1 steel 23x84"
1—Deane 4x4 Triplex Pump
1—Spencer Oiler 48"
1—D&F 80x1⅞ Jack Winder
Motors
Warpers
Scales
Bobbins—Spools, etc.

• • LIQUIDATIONS

McKITTRICK CO. INC. 1935

McKittrick, Treas. R. W. McKittrick, Sec.

WORSTED MACHINERY

Lowell, Massachusetts

REPAIR SHOPS
Mill Brushes
Worsted Top Roll Covering
Faller and Circle Repairing
Belting—New and Rebuilt
Rebuilding and Reconditioning

EDWIN FARNHAM GREENE—McCORD CORPORATION

Announce the Complete Liquidation of the

COTTON SPINNING, WEAVING AND YARN DYEING MACHINERY, SUPPLIES, etc.

Of the R.H.R. and Associates. Formerly Property of Otis Company.

CONSISTING OF THE FOLLOWING

OPENING and PICKER ROOM UNITS

Woonsocket bale breaker, style 47 with 36 in. 12 ft. lattice apron, following this and direct connected are Saco-Lowell vertical opener, Woonsocket condenser (cage section), Saco-Lowell vertical opener, Woonsocket condenser (cage section), Woonsocket spirawhile cleaner, 40 in. (Buckley), Woonsocket condenser (cage section), two Murray cleaners, Woonsocket condenser 36 in., Woonsocket rake head distributors, 3 Openings, feeding to 3 Woonsocket Simplex lappers #43 with auto. feeders.

The other unit is the same as above with the exception that the bale breaker is of H & B make with 4 Simplex lappers instead of 3 as above.

All above motor driven, largely individual drive.

1—Saco-Lowell—2 section—W-3 Waste machine, apron feed, apron delivery—age 1921.
1—G. E., 15 HP, motor #3741852, type KT 312, form B, 60 cycles, 3 phase, amp. 15.6, volts 550, speed 1160—starting compensator.
1—Kitson Waste Opener—lattice feed, lattice delivery, 15 in. on entering end, 17¾ in. on delivery end, belt driven.
1—Kitson 40 in. finisher picker, with 3 blade Buckley beater and screen section.
2—Woonsocket Condensers—36 in.
1—Hillard & Goldsmith—thread extractor for spinners waste.
1—Hopper feeder—38 in.
1—Logeman Bros. waste baling press, #5197, 5 ft. x 2½ ft. x 3 ft.
2—Lots lap rods—47½ in.

CARDS

135—Whitin r. f. Cards 40 in.—12 in. Coilers, 27 in. Doffers, model H 110/120 wire equipped with Chapman Neutralizers and Cook Vacuum Stripping system.
5—Card grinder sets.
1—Dronsfield floor grinder for 40 in. cards.

DRAWING FRAMES

10—Whitin Drawing frames, 4 del. each, Metallic Top Roll, 1—⅛ in. F. R., 12 in. Coilers.
32—Whitin Drawing Frames, 4 del. each, Metallic Top Rolls, 1—⅛ in. F. R., 12 in. Coilers, direct connected 5 HP., 550 Volt, 3 Phase Motor.

SLUBBERS

4—Woonsocket 11x5½ slubbers, 68 spindles, 1¼ in. Bottom Front Rolls, with Leather Shell Top Rolls, 9 in. Ga., Chain Drive.
5—Woonsocket 11x5½ slubbers, 60 spindles, 1¼ in. Bottom Front Rolls, with Leather Top Rolls, 9 in. ga., chain drive.

INTERMEDIATES

8—Woonsocket 10x5 Inter. 78 Spdl., Long Draft—1934, 1 in. bottom front Tolls, equip. with Campbell Ball Bearing Top Rolls, 7½ in. Ga., 6 Chain Drive, 2 Vertical Drive.
12—Woonsocket 10x5 Intermediates, 78 spindles, 1¼ in. Pottom Front Rolls, equipped with Campbell Ball Bearing Top Rolls, 7½ in. ga., Vertical Drive.
2—Saco-Lowell 10x5 Intermediates, 78 spindles—Age 1913, 1—⅜ in. Bottom Front Rolls, Shell Top Rolls, 7¼ in. ga.

FLY FRAMES

4—Woonsocket 8x4 Fly Frames, 96 spindles, 1⅛ in. Bottom Front Rolls, 6 in. ga. chain drive.
26—Woonsocket 8x4 Fly Frames, 128 spindles, 1⅛ in. Bottom Front Rolls, equipped with Campbell Ball Bearing Top Rolls, 6 in. ga., 20 Chain driven, 6 Vertical driven.
2—Woonsocket 8x4 Fly Frames, 104 spindles, 1⅛ in. Bottom Front Rolls, equipped with Campbell Ball Bearing Top Rolls, 6 in. ga., Vertical driven.

SPINNING

4—Whitin Ring Spindle Frames, 228 spindles case hardened front rolls, separators, metallic thread boards, tape driven, clutch spindles, Model F, 3½ in. ga., Belt driven.
56—Whitin Ring Spindle Frames, 228 spindles, shell Front Rolls, Separators, Metallic Thread Boards, Tape Driven, Model B, 3½ in. ga., Belt Driven.

TWISTERS

5—Draper dry twisters, 112 spindles, Knee brakes, wood Thread Boards, 5 and 6 ply-wood Creels, 3½" ring, Separators, 4½ in. ga., Band Drive.
22—Whitin Ring Twisters, 140 spindles, Knee Brakes, Wood Thread Boards, 5 and 6 Ply-wood Creels, 3½ in. ring, Separators, 4½ in. ga., Band Drive.
1—Whitin Ring Twister, 150 spindles, Wood Thread Board, sgl. Beam Stand, Separators, 4½ in. ga., Band Drive.
1—Draper ring twister, 160 spindles, wood thread board, Knee brakes, 5 ply-wood creel, 3½ in. ringe, 4½ in. ga., band drive.
20—Whitin dry twisters, 192 spindles, Knee Brakes, Porc. Guides metallic thread boards, 6 ply creels, 3½ in. ga., separators, 4½ in. ga., band drive.
1—Hopedale sample twister, 10 twister spindles, 10 spooler twisters, wooden thread board, 7 ply creel, 5 in. ga., band drive.

QUILLING

15—Whitin long chain quillers, 378 spindles, 2½ in ga.

WINDING

3—Universal Winders #50—cone—6 spindles.
4—Universal Winders #50—tube—6 spindles.

WARPING

2—Lestershire Magazine Creels 460 ends, with lint fans, motor driven.
2—Entwistle Lease Warpers with lint fans, with Balling heads and dials, motor driven.
14—Hopedale & Entwistle cotton Warpers 54 in. and 60 in., 450 and 512 ends, all wooden steps.
15—Ball Warpers 54 in. Creels, from 512 to 640 ends, 10 wooden steps, 5 iron steps.
4—Entwistle beamers.

SPOOLING

4—Draper spoolers, 110 spindles, Ball tensions, 4¾ in. ga., belt driven.

TIEING IN

1—Barber Colman Warp tieing machine 4E #229.

SLASHING

6—Lowell Slashers 1—5 ft. and 1—7 ft. cylinders—gear drive double deck size boxes, C.I., 2 copper rolls in size box, inside meas. 61 in. x 12 in. x 29 in.—top box 61 in. x 8 in. x 22 in., 7 beam creels, head end 61 in.—cut markers all gear driven.
1—Saco-Lowell Slasher 5 ft. & 7 ft. cylinders, roller bearings, Powers regulator—Age 1933—size box 62 x15x32 C. I., 7 beam creel, head end 61½ in., gear driven.
1—Lowell Slasher—7 ft., 5 ft. and 3 ft. cylinders, roller bearings, tag control double size box, 7 beam creel, gear driven.
8—Trolley tracks & Hoist for slashers.
1—Holbrook syphon for #1 slasher.

KETTLES

5—Lowell size kettles 36 in.—5 equipped with individual plunger pumps.
1—Lowell size kettle, 33 in. x 32 in.—no agitator.
1—Lowell size kettle, 42 in. x 42 in.—with agitator.
5—Vertical size pumps, 2—¾ in. x 6 in. for size kettles.
1—Lowell size kettle—42 in. x 39 in.—no pump, top, or agitator.
2—Size Kettles 48 in., with agitators.
1—Size Kettle.

YARN CONDITIONER

1—Hygrolit Yarn Conditioner, Model 3AY, #1336—Age 1934.

STRIPPERS

2—Termaco Roving Bobbin Strippers.
2—Utsman Double end Bobbin Strippers.

BANDING MACHINES

2—Cole Bros automatic banding machines, 1—25 spindle and 1—11 spindle.

CLOTH ROOM

1—Elliott Folder 39 in. high front—type 1—¼ yd. fold.
1—Elliot & Hall cloth folder, high type overhead, 38½ in. x 1¼ yard fold.
1—J. D. Elliot folder, unrolling head, 38½ in.—1 yard fold.
1—J. D. Elliot high front folder, 38½ in.—1 yd. fold.
1—J. D. Elliot 36 in. cloth folder.
1—Houston Foot power sewing machine—#1836.
1—Dinsmore railway sewing head 42 in.
1—Dinsmore—2 roll winder sewing head, 1¼ motor.
1—G. R. Cowan—hydraulic baling press, 42 in. x 30 in. x 66 in.—14 in. Ram.
1—Hydraulic baling press, 14 in. x 18 in. x 52 in.—8 in. Ram.
1—Hydraulic Baling press, 36 in. x 54 in. x 70 in.
1—Smith & Winchester undercut hand paper cutter, 36 in. x 39 in. wide.
1—Vertical Brusher, 6 Brush, 2 Hair Brushers, 2 steel brush and 2 sand paper.
1—2 Roll Winder 48 in.—1 Guide roll stand.
1—B. F. Sturtevant blower—about 16 in. intake and outlet with piping.
1—Park & Woolson—3 blade shears 48 in.
1—C & M Cloth inspecting frame, 34 in.
1—Curtis & Marble Inspecting machine 60 in., cloth glass front with light under glass.
1—Cloth inspecting (Burling Machine) 40 in. Cloth.
1—Curtis & Marble machine 42 in. roll with measuring dial for 40 in. cloth.
1—48 in. Cloth roller—2 Rolls.
1—Cloth roller—46 in.—2 rolls.

LOOMS

724—32" to 36" Draper Auto. looms Aux. shaft.

DYE HOUSE

1—Franklin package dye machine, 1000 lb. capacity, Serial #1338, with pump and 40 HP. Motor, 1200 R.P.M.
10—Indigo Vats 2—40 in. Rubber rolls—iron box, wood casing, with skein racks, each tub has 8 Brass roll—2—51x120x82 deep.
2—Indigo Vats, 32 in. rubber rolls—iron 144 in. x 36 in. x 82 in. deep.
1—Two compartment bleach machine wooden box, 66 in. x 49 in. x 35½ in., each compartment has two rubber squeeze rolls.
1—Three Compartment bleach machine, 37 in. x 36 in. x 33 in., each compartment has two rubber squeeze rolls.
1—Two compartment boil-off machine, 1 compartment 60 in. x 41¾ in. x 40 in. equipped with 6 copper rolls, 2 rubber squeeze rolls and 1—18 spindle creel, 1 compartment 35 in. x 51¾ in. x 40 in., with two rubber squeeze rolls, both compartments iron boxes.
1—Sample Dye Machine 61 in. x 19 in. x 24 in., wooden box, with 1 pair rubber squeeze rolls, 14¾ in. on rubber.
1—C.I. Box sulphur and vat black finisher, ea. 74 in. x 44 in. x 38 in., two rubber squeeze rolls, 40 in., 14 in., dia. overhead plater.
1—Direct dye machine, 37½ in. x 22 in. x 87½ in., with two rubber rolls, 34 in. on rubber—10 in. dia. —screw set, iron equipped with overhead wooden guide.
1—Dye Machine, iron box 87½ in. x 85 in. x 22 in., with immersion rolls and two rubber squeeze rolls.
1—Three Compartment dye machine, iron box 74 in. x 44 in. x 38 in. each., 3 sets immersion rolls, 3 rolls top, 4 rolls bottom, ea. compartment has two rubber squeeze rollers.
1—Dye Machine, iron box 87½ in. x 35 in. x 22 in., 4 immersion rolls on top and bottom, one two rubber roll squeezers.
2—Dye Machines, iron boxes, two compartments ea., 74 in. x 44 in. x 38 in., with four brass immersion rolls on bottom, three brass rolls on top with rubber squeeze rolls.
1—Two compartment Dye Machine, wooden boxes, ea. compartment 79 in. x 19 in. x 27 in., with immersion rolls, and two rubber squeeze rolls.
1—Dye Machine, iron box, 87½ in. x 35 in. x 22 in., wood immersion rolls, and two rubber squeeze rolls.
1—Dye Machine, wood box, 74 in. x 44 in. x 38 in., with four brass immersion rolls on bottom and three brass rolls on top, and one-two rubber roll squeezer.
1—Butterworth Dye Machine, two compartments, iron box, 74 in. x 44 in. x 38 in., with four brass immersion rolls bottom, 3 brass rolls on top, ea. compartment has two rubber squeeze rolls.
1—Three Compartment Dye Machine, Textile, 60 in. x 56 in. x 40 in., ea. compartment has two squeeze rolls.
2—Two box Boil-off Machine, iron boxes, Textile, 108 in. x 51¾ in. x 40 in., 7 copper cans 33 in. and one-two roll rubber squeezer. Second box, 53 in. x 35 in. x 40 in. equipped with 20 spindle stand, rubber squeeze roll.
1—Hydro Sulphite Plant—consisting of:
1—D.O. 2 weighing plant.
1—Hydro mix tank.
1—Filter press, 32—18 in. x 18 in. plates.
1—Hydro storage tank 4 ft. x 4 ft.
1—Suction Pump 1½ in. Class B.
1—Scale 100 lb.
1—Indigo reducing tank with agitator.
1—Mangle—3 roll—2-10 in. steel—1-12 in. Cotton, screw set—76½ in. 1 set, 30 Dry Cans vertical stacks—1 stack 10 can, 2 sets 9 cans—2 Idler Cans.
1—Mangle—2 roll, 75 in. Rubber on Brass, box 10 in. x 86 in., rubber roll in 2 sections, 1—37 in., 1 38½ in., with 1 Butterworth Horizontal steam pump 6 x 8.
2—Butterworth 9 can stack vertical tin cans, 23 in. x 140 in., two overhead platers, wood rolls, iron frame, 8 delivery rolls.
1—7 can dryer with 2 copper cans, 33½ in. x 16 in. dia.
2—R. B. & F. sets dry Cans—13 cans to stack 36 in. x 70 in., horizontal, delivery for 12 skeins.
4—Butterworth sets tin dry cans, 23 in. x 144 in., vertical, 2 sets of 18, 1 of 16, 1 of 13, 2 Bundy traps #54, Delivery rolls for 12 skeins.
1—Tolhurst extractor 48 in.—overhead driven.
2—Iron Tanks 4½ ft. x 6 ft. x 3½ ft.
1—Iron Tank 4½ ft. x 7 ft. x 2 ft.
2—Galvanized tubs—1—24 ft. x 15 ft. and 1—24 ft. x 10 ft.
6—Pairs rubber squeeze rolls, 40 in.—15 in. dia.
1—Patch dryer—19¾ in.
4—Lowell Indigo Grinders 60 in.
1—Filter tank 60 in. x 60 in., 70 gals. per min., Hungerford & Terry on iron stand.
1—Copper tilting kettle on iron stand—25 Gallon.
80—Dye trucks, various sizes, wood.
3—Dye Box Racks.
1—Butterworth 4 roll Calender #41 in.—2-husk 16 in. —2 steel 10 in. Mycock, 5 bar expander—2 steel rolls are heated.
1—Holyoke 3 roll calender 41 in.—2-husk 16 in.—steel 9 in. middle roll heated—3 roll iron Mycock expander—2 roll 40 in. cloth roller. Unwinding Head 40 in.—1 Dampening box 40 x 18 x 60.

ROVING CANS

4500—12 in. Roving cans, metal tops and bottoms, kick bands, no waste, seamless.

HUMIDIFIERS

39—Parks HD S Humidifiers.

COOK & CO. STRIPPING SYSTEM

Cook & Co. vacuum card stripping system for 24 cards.
Cook & Co. vacuum card stripping system for 48 cards.
Cook & Co. vacuum card stripping system for 96 cards.

COMPRESSORS

1—Ingersoll-Rand Air Compressor, 12 x 10 with After Cooler and Receiver, No. 24303, Type ER 1.
1—Anglo American Air Compressor, 22 x 8—1 Receiver for Vacuum Stripper System No. 34484, Type ER 1.
1—Anglo American Air Compressor, 22 x 8, for Card Stripping System with Receiver, No. 34488, Type ER 1.
1—Anglo American Single Horizontal Vacuum Pump, 22 x 8, for Card Stripping System, and Receiving Tank for 96 cards, No. 23982, Type ER 1.

STACKERS

2—Louis Shepard hand power stacker, 750 lbs.

MOTORS

166 Motors from ¼ to 75 H.P.

MISCELLANEOUS SUPPLIES and OFFICE EQUIPMENT

Adding Machines, Calculators, Typewriters, Desks, Chairs, Desk Lamps, etc., and Cabinets.

LARGE QUANTITIES SKEWERS BOBBINS and SPOOLS

COMPLETE MACHINE and BLACKSMITH SHOP. COMPLETE CARPENTER SHOP, PAINT SHOP, BELT SHOP and ROLL COVERING SHOP

All Inquiries Should Be Addressed to

EDWIN FARNHAM GREENE-McCORD CORPORATION

51 Madison Ave., N. Y. C. — 49 Westminster St., Providence, R. I.—Tel. Gaspee 1481

N. Y. C. Tel. Murray Hill 3-2945 • Ware, Mass. 457 • Cable Address—Macordex, N. Y. C.

ML C BUYING and SELLING TEXTILE EQUIPMENT ML C

COTTON EQUIPMENT

1—45" Model #38 Woonsocket Bale Breaker, 10' feed apron
1—40" Kitson Breaker Picker with Buckley and 2 blade Beater
1—40" Saco Lowell Intermediate Picker
1—40" Saco Lowell Finisher Picker
1—40" H & B Single Process Picker
60—40" Whitin Cards, 27" doffers, 12" coilers, excellent clothing
30—40" H&B Cards
15—40" Saco & Pettee Cards
80—Del. H&B Drawing, leather top rolls
40—Del. H&B Drawing, metallic top rolls
12—Woonsocket Chain Drive Speeders, 8x4—128 spindles
2—Easton & Burnham High Speed Warpers with 800 end cone creels
13—Whitin Tape Driven wet twisters, 3" gauge, 224 spindles
6—Collins Tape Driven Novelty Twisters, 200 sp., 3⅛" gauge, motor drive
252—Draper 40" E Model Looms, 45½" R.S., Roper let off, 2 bank warp stop motions auxiliary shafts, Lacey Tops, Midget Feelers, belt driven, order number over 3500.
150—Draper 40" K Model Looms, Roper let-off, midget feeler, 20 harness dobby, 3 bank warp stopmotions, order No. over 3700
6—C&K 42" Automatic Plain Shuttle Chain Looms, 47½" R.S., feelers, friction let-off, 6 bank mechanical warp stopmotion, auxiliary shaft.
200—C&K 4x1 Looms, 48½" B.S., 25 harness dobbies, motor driven, 4 bank Regan Warp stopmotion, friction letoff, arrange for automatic attachments, 1923
100—C&K 43½"Automatic 4x1 Looms, 20 harness dobby, motor driven
20—No. 90 Universal Winders
1—Sipp Eastwood Cone Creel and Warper, 816 ends, 1933
20—20 C&K 54" Looms 4x4, 20 harness, motor driven
3—C&K 96" Automatic Shuttle Changing Looms

SILK EQUIPMENT

200—C&K 2x1 and 4x1 Silk Looms, 72", 90" and 96" large shuttles
100—54" C&K Automatic Bobbin Changing Silk Looms
100—Stafford Automatic Shuttle Changing Looms, 47½" R.S., 20 harness dobbies

WASTE AND BATT MACHINERY

Complete Modern Whitin Waste Yarn Unit for ⅛ to 2 hank complete
Complete Modern Whitin Waste Yarn Unit for 3 to 5 hank complete
2—48" D&F 1-cyl. Woolen Cards
1—48"x48" Cleveland 2-cyl. Woolen Cards
1—Set of 4 60"x48" English Shoddy Cards, all-iron
2—48" Bramwell Feeders
2—60" Smith Single Cylinder Garnetts
1—James Smith 60" wide 2-cyl. Garnett with Camel Back
6—English 60" wide 3-cyl. Garnetts with Breasts, Automatic Feed, each pair equipped with Blamire attachment
3—60"x30" James Smith 3 cyl. Garnetts, 16" Metallic Breasts complete with Bramwell Feeders
1—30" Schofield Lumper
1—40" James Smith Mixing & Burring Picker
8—Automatic Quilt Sewing Machines, Wheeler & Wilson Heads, motor driven
2—60" P&S Type Shredders, metallic breast
2—James Smith 66" Cone Willows with Fans

KNITTING MACHINERY

4—3½" S&W Model K 13 Step Spiral, 136N
9—3½" S&W Model K 160 N
26—3½" S&W HH 176 N., 5 step

Solving your
PROBLEMS

It is the function of our business to serve you in meeting those problems which changes force upon you from time to time.

for example:
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You may use our service when you require machinery quickly to do a certain task and still keep within a moderate budget allowance. We have for disposal thousands of dollars worth of efficient production equipment at prices that will meet almost any budget limitations.

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Idle equipment

It may be necessary for you to dispose of idle equipment to install machinery you sorely need. Here, again, you may use our services and capitalize profitably on our wide contacts in the domestic and foreign textile machinery markets.

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YOU HAVE A MILL

that has served its purpose and should be liquidated. In this we offer you our broad experience most effectively to market your equipment without waste of time and at but a modest cost.

14—3½" S&W 180 N. 25 step HH Model
20—3½" Banner 220 N. 7 step
10—3½" S&W Model K 220 N.
10—3½ S & W-H.H. 220 N., Spiral
30—3½ Banner 220 N., Wrap
26—3½" Banner 240 N. Plain
6—3½" S&W Model K 240 N.
40—3½ S & W.-K 260 N.
12—3¾" S&W Model K 13 Step Spiral, 148N.
25—3¾" S&W HH 176 N., 5 step
12—3¾" S&W Model K 176 N.
53—3¾" Banner 220 N. Plain
59—Loopers, 12 to 30 point
15—Wildman 8 and 12 cut, 11" to 15"
1—Set of 8 Leighton 9 cut, 11" to 20"
5—Scott & Williams, 11 cut, 12" to 14"
8—Cooper Type G 14 cut, 18" to 22"

SEWING MACHINES

12—Singer 81—16
8—Singer 69—20
5—Singer 107W1 Zigzag

WOOLEN EQUIPMENT

1—30" Schofield Lumper
1—Set of 3—48"x60" Lombard all-iron cards
14—72" C&K 4x4 Looms, 20 harness
20—82" C&K 4x4 Looms, 20 and 25 harness
20—92" C&K 2x1 Looms, Baker Automatic

DYEING AND FINISHING

1—60" Van Vlaanderen Button Breaker, Bakelite Rolls
1—41" Butterworth 3-roll Calender
1—42" Butterworth 3-roll Friction Calender
1—47" Butterworth Hydraulic Calender
1—54" 2-roll Calender
1—63" Maag 3-roll Calender
2—60" Kenyon Chinchilla Machines
1—69" Sjostrom Cooling & Conditioning Machine, 3 sections
1—72" Butterworth 2-bowl Crab
1—Van Vlaanderen 7 tier Net Dryer
1—National 4 fan Loop Dryer
1—Set of 28 Rusden type 23"x47" Copper Dry Cans
1—Set of 17 Butterworth 23"x66" Tinned Iron Dry Cans with 5 sets of Squeezers
1—100" Proctor Raw Stock Dryer
1—72" P&W Decating Machine
1—72" Klug Decating Machine
1—60" Windle Doubler
1—1000 lb. Klauder Weldon Raw Stock Dyeing Mche.
6—50" Dye Jiggers, wood boxes
1—200 pound 6 pocket Rome Monel Metal Rotary Dyeing Machine, belt driven
2—62" 2-roll Embossing Machines
2—40" Tolhurst Extractors
2—48" Tolhurst Extractors
1—72" C&M Vacuum Extractor
1—50" Starch Mangle
1—65" Mangle, Rubber Rolls
1—72" Woonsocket 12-roll S.A. Napper
1—80" Woonsocket 36-roll D.A. Napper
1—90" Woonsocket 36-roll D.A. Napper
1—42" Padder, Rubber on Copper
1—47" Padder, Rubber on Brass
1—48" Padder, Brass on Rubber
2—48" Padders, Rubber Rolls
1—60" Morrison Palmer Unit & Quetch
1—66" Gessner Rotary Cloth Press
1—60" Morrison 3-roll Quetch
1—66" P&W Model B 2-blade Shear
1—72"C&M 4-burner Singer
1—50" Butterworth 30 ft. Tenter
2—43" P&W Silk Examining, Tube & Board Winding and Measuring Machines with Motors

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Rayon Plant—60 K Model 45½" Looms with winders, quillers, etc.
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Woolen Mill—6 Sets 50—92" C&K 4x4 Looms with Dyeing & Finishing Machinery

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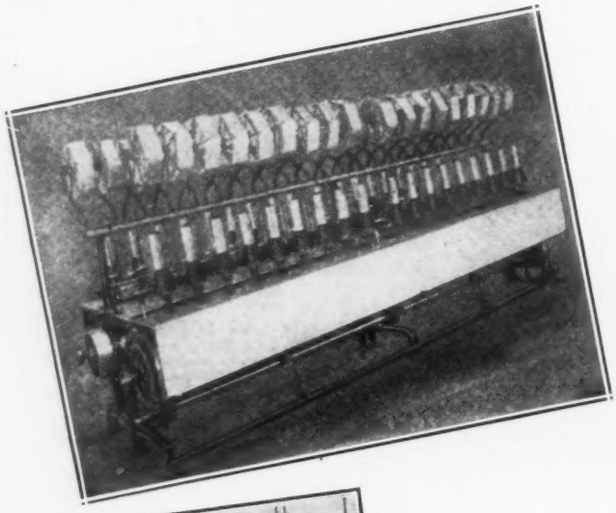

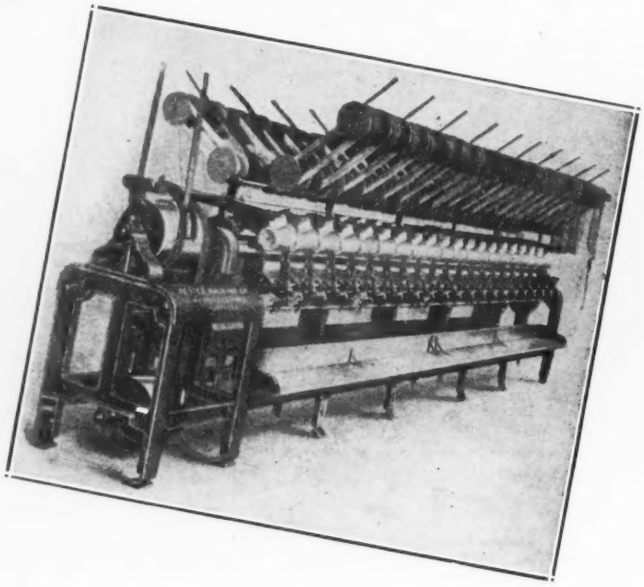

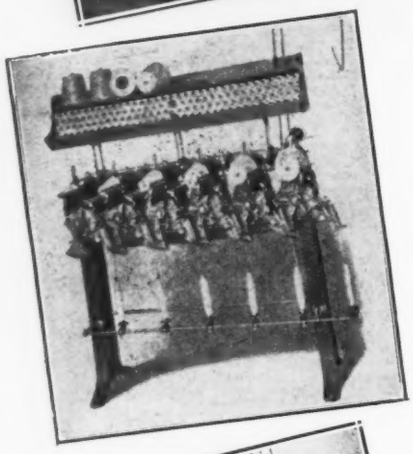

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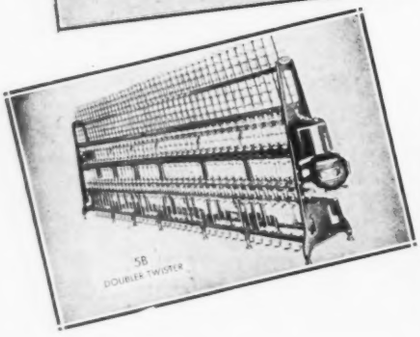

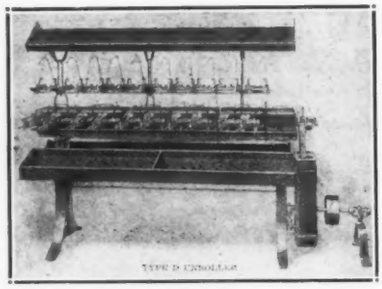

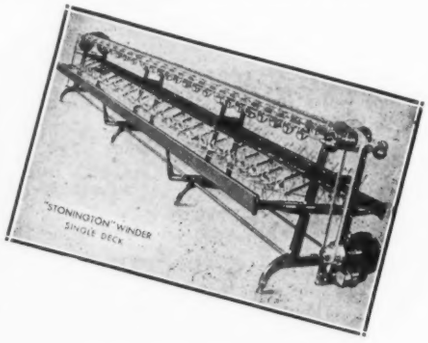

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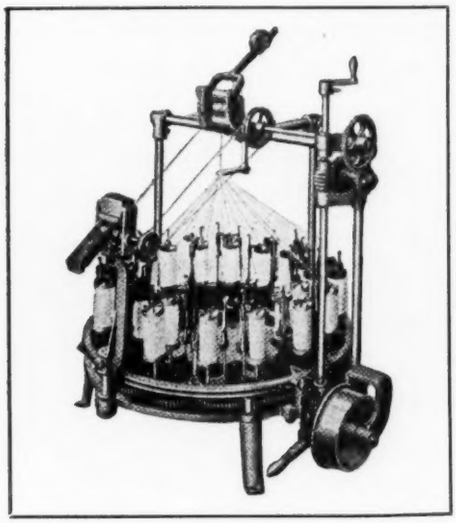

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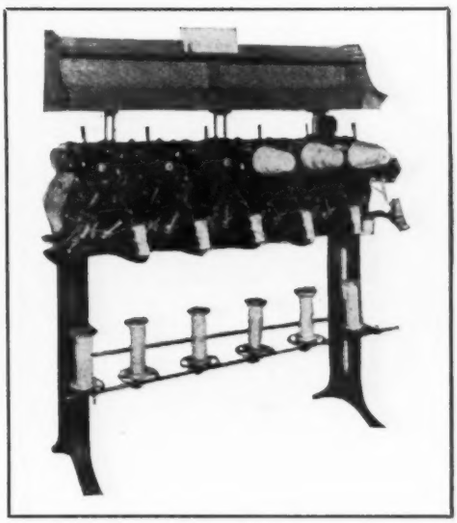

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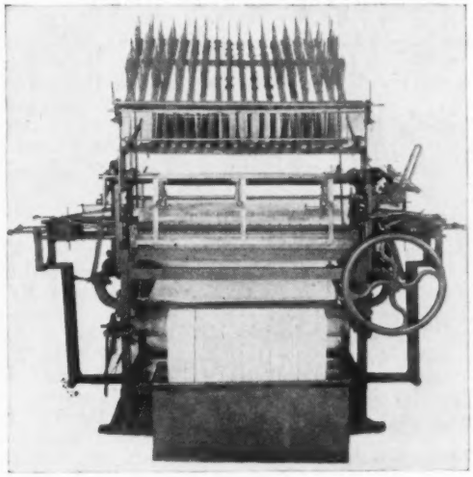

We have a complete line of **Winding and Spooling machinery** FOR EVERY CONCEIVABLE USE, FOR WINDING BOBBINS, TUBES, CONES AND BOTTLES OF COTTON, RAYONS, & WORSTED YARNS, FOR ALL USES.

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6—Single Cylinder, 30x60 J. Smith Garnetts, Auto Feed
1—48" C. & M. Fearnaught Mixing Picker
1—36" Sargent Burr Picker, with automatic feed
1—30" Schofield Lumper
6—Picker Feeds 30" and 60"
1—12', 20" Slat type feed apron
1—Sargent Raw Stock Dryer, 2 section, Auto feed
2—6'6" Sargent Cone Dusters
4—J. & B. 360 spindle, 2" gauge Mules
1—48" & 1—60" Furbush Card Grinder
1—Portable 60" Traverse Grinder
4—Twisters 2½" to 6¼" ring, Plain and Fancy
1—4 Bowl Wool Scouring Machine
2—Schofield Rag Pickers

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30—#50 Universal Winders "REBUILT"
50—#90 Universal Winders "REBUILT"
6—#180 Universal Winders
1—96 sp. and 1—144 sp. J. & B. Jack Winders
2—48, 1—40 and 1—32 sp. O. Lever Cop Winder
1—378 Sp. Whitin Long Chain Quiller
1—90" Saco Lowell Worsted Warp Slasher
1—D. & F. Warp Dresser
5—6 drum Worcester Compressor Spoolers
4—72" to 85" Pin and Pinless Warping Mills
12—Beaming Frames, various widths
7—Sipp Silk Spoolers
1—Oswald Lever Chenille Cutter
4—100 sp. Foster Winders Motor Drive #12 and #30

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Harness Frames, Spools, Etc.
LOOMS, used or rebuilt for your particular needs
10—120" C.&K. Looms, 4x4 box
10— 92" C.&K. Looms, 4x4 box 25 har.
40— 82" C.&K. Looms, 4x4 box 25 har.
20— 76" C.&K. Looms, 4x4 box 25 har.
10— 72" C.&K. Looms, 20 har, with multipliers
10— 65" C.&K. Looms, 4x4 box with multipliers
14— 48" C.&K. Rug Looms, 3x3 box, 2 har.
20—Halton, 400 hook, D.L.S.C. Jacquards
20—Crompton & Knowles 600 hook D.L.S.C. Jacquards
20—Halton, 1304 hook D.L.S.C. Jacquards
6—Halton, 2608 hook D.L.S.C. Jacquards
30—2 and 3 section 640 hook Single Cyl. Rise & Fall Jacquards
30—Sets 22" C.&K. Beam Flanges
1—Cincinnati Time Recording Clock

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3—P.&S. 2 bowl Skein Scouring Machines
3—Rehfus Fringing Machines
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2—Kenyon 66" Chinchilla Machine
1—Roy 65" Cloth Shear Grinder, NEW
1—96" Roy Napper Grinder
2—C.&M. Gas Singers, 1-2 Burner 64"
5—15 foot Railway Sewing Machines for rugs and carpet
1—66" Four cylinder Brush
1—80" Double cylinder Cloth Brush and sander
3—P.&W. Double Cylinder Teasel Gigs
2—66" Single Cyl. Teasel Gigs
1—66" Steiner Dewing Machine
2—#10 Hunter Fulling Mills
2—#11 Hunter Fulling Mills
6—Cloth Washers - Hunter 8 string
1—Soaper, open type; rolls 40x3½
2—72" Yorkshire Crabs

DYEING AND FINISHING MACHINERY—Continued

1—5 Bowl Continuous Crab
1—Klug Full Decating Machine
3—96", 36 roll, D.A. Woonsocket Nappers
1—80", 14 roll, D.A. Borscher Napper
1—72" D. Gessner 2 pc. Knit Goods S.A. Napper
1—66½" D. Gessner Century Cloth Press
1—D. Gessner, Jumbo type Rotary Cloth Press 66½"
1—66" D.B. Rotary Voelker Cloth Press
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2—C.&M. Tacking Machines
1—90 yd. Kenyon Cloth Dryer 60" wide
1—Hurricane Skein Yarn Dryer, 2 truck
1—Set (19 cans) Butterworth Drying Cans 65" face
1—Set 142" Butterworth Dry Cans 14 cans
1—2 truck Skein Yarn Dryer
1—Bailey Skein Yarn Dryer
1—P.&S. Continuous Skein Dryer
1—66½" P.&W. Dbl Shear with list saving
1—60" P.&W. Plush Shear
1—Power Plush Splitter
1—58", 4 cyl. Hermas Shear
1—Werner Vacuum Extractor—Sgl. Pump
6—60" Fletcher Extractors, Motor Drive
1—20" Sample Extractor
4—Tolhurst Blt. Driv. Extract., 40" & 48"
1—C.&M. 66" Wetting out Machine
1—Smith Drum 30 arm Skein Dye Machine
1—10# Franklin Process Dye Machine
2—Klauder Weldon Skein Dye Machines
1—6 Comp Cont. Warp Dye Mach. with Can Dryer
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1 Butterworth 3-Roll 50" Water Mangle.
2 Gessner 72" S. A. Nappers. 18 Rolls.
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4 Hughes 48-Spindle Bottle Bobbin Winders.
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1 Gerry 48" Lumper.
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20 Fales & Jenks Ring Twisters, 200 Spindles, 3½" Gauge, 2½" Ring.
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4—**Saco-Lowell 3 Beater Single Process Pickers;** rebuilt 1934 with blending reserve, pedal eveners, ball bearing beater fan, excellent condition
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20—**Saco-Lowell 40" Cards, 12" coilers**
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6—Copper Jacketed Color Kettles, 75 to 150 gals.

3—Butterworth & Textile Agers, 30' to 24'.

3—Open Soapers, with dry cans, padders, etc.

3—Rodney Hunt Rope Soapers, 8' to 10'.

1—Butterworth 60' Mercerizing Range.

100—Foxwell Guiders, electric Guiders, Mycock & Barrel expanders.

Complete Bleach House with ten Kiers, 5-ton to 3½-ton, Heaters, Bleach House Washers, Squeezers, Pilers.

Complete White Room, including 3 sets of forty 120" Copper Cans, Water Mangles, Scutchers, Brushing Machines, etc.

500—Copper Dry Cans, 120" to 42" face.

6—Textile Dye Padders and Water Mangles, 2 and 3 roll.

25—Simpson & Textile Batchers.

10—Elliott & Hall Flat Folders, air lift.

4—Windle 54" Doublers.

2—Butterworth Singers, Kemp Burners.

2—Morrison Button and Spiral Breakers.

10—Butterworth & Textile Hydraulic Schreiner, Friction, and Finishing Calenders.

18—Textile 50" Dye Jigs.

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Machine Shop, Carpenter Shop, Office Equipment and Furniture, Foxwell Guides, Brushing Machines, Mycock Expanders, Thermal Heating Units, Sewing Machines, Wooden Shells, Pumps, Motors, Electric Equipment, Winders, Pilers, Poteyes, Pleaters, Laboratory Equipment.

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2—34" **Saco-Lowell High Back Hopper Feeders**

2—38½" **Saco-Lowell High Back Hopper Feeders**

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4—**Saco-Lowell Finisher Pickers,** 2—1917, 2—1913 model, ball bearing Kirschner Beaters, Motor driven.

20—**Saco-Lowell 40" Cards,** 1917 model, equipped with Firth Stripping Device, 12" coilers, good condition.

3—Sets **Card Grinders** including Drum Grinders for Saco-Lowell and Whitin Cards.

7—**NaSmith Combers, 12" Coilers,** leather top rolls.

1—**Sliver Lap Machine.**

1—**Ribbon Lap Machine.**

2—#1-A **Saco-Lowell Condensers** with built-in Fans.

2—**Saco-Lowell Distributors** for two Hoppers.

32—**Deliveries Saco-Lowell Drawing,** 1917 model, 4 deliveries per head, 12" coilers, metallic top rolls, 1⅛" Roll.

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3—9x4½ **Saco-Lowell Intermediates,** 120 Spindles each, 1917 model.

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350—**DRAPER MODEL "K" LOOMS** (1928) 47⅛" reed space. Looms have latest type equipment.

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250M—**SPINNING RINGS,** #1 and #2 flange. Size: 1⅝" to 2". Also Holders if desired.

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50—**Banner Split-foot** 3½" 240 N.
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Two husk Calender Rolls (NEW) 52" face

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Geographical Index — Used Textile Equipment Advertisers This Issue

Athens **GEORGIA** Page
Upchurch & Sons, Inc., C. L....185
Andover **MASSACHUSETTS**
Stephenson, Harry 182
Boston
Bradford, Roy H.....186
Fall River
Bay State Textile Co.....184
Fyans, A. F.....185
Lowell
Langevin, Geo. F.....184
Springfield
Marshall's, Inc. 187
NEW HAMPSHIRE
Manchester
Amoskeag Industries, Inc.....186
NEW JERSEY
Belvidere
Consolidated Products Co., Inc...183
Paterson
Paterson Silk Machinery Ex., Inc. 187
NEW YORK
Maspeth, L. I.
Pernick Co., Inc., Joseph.....186
New York City
Gaines Textile Machinery Co....180
Edwin Farnham Greene-McCord.178
Industrial Plants Corp.....184
Machinery Liquidating Co., Inc..179
Solomon & Co., Inc., Robert.....181
Stanhope, Inc., R. C.....186
Williams 186
Troy
Cady, A. J.....184
PENNSYLVANIA
Philadelphia
Ambler Textile Machinery Co....184
Collins & Aikman Corp.....186
French, C. M.....185
Kerwin, Michael 183
McCloskey, Inc., John J.....186
Slaybaugh, James 186
Wheeler, Frank W.....182
RHODE ISLAND
Pawtucket
Standard Mill Supply Co.....183
Providence
Consolidated Products Co., Inc..185
Horton, Harold W.....185
National Machinery Co.....187
Windle & Co., J. H.....184

Power Equipment

NEW YORK

New York City
Howe Brothers 187

Machine Tools

PENNSYLVANIA

Philadelphia
The O'Brien Machinery Co.....187

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GOOD USED TEXTILE MACHINERY AND SUPPLIES

SPECIALIZING IN WORSTED MACHINERY

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Also several thousand additional motors up to 250 H.P. Send us your inquiries.

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SUPPLIES, MOTORS •

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1—**Hunter Wool Scouring Machine,** 4-Bowl.
1—**Sargent Raw Stock Dryer,** Sgl Apron, 72", 1917.
1—**Sargent Cone Duster** 7'.
1—**James Smith Garnett,** 3-Cyl. 60x30.
1—**James Smith Garnett,** 3-Cyl. 40x30.
1—**C. & M. Fearnaught Picker** 48".
2—**Kitson Waste Dusters, Feeds & Condensers.**
7—**Set Cleveland Worsted Cards** 48"x48".
10—**J. & B. Mules** 360 spdls. 2¼" ga. 1915.
3—**Prince Smith Combs,** Ball Bearings, 1919.
2—**Alsacienne Intersect. Gill Boxes,** Dbl. Balling.
1—**Worcester Compressor Spoolers,** 6-Drum, 32⅛".
8—**Univ. Winders,** #90, Bunch Bldrs, 8¾" Bob.
2—**Lowell Cone Rovers,** 8x4, 64 Spindles.
2—**Collins Bros. Fancy Twisters,** 200 spdls. 2" ring, Double Rolls.
2—**Foster Cone Winders,** 100 spdls. #30.
1—**Foster Tube Winder,** 100 spdls. #30.
27—**C. & K. Looms** 82"—25 harness 4x4 box, m.d.
25—**C. & K. Looms** 78"—20 harness dobbies, 2x1 Box Automatic.
23—**C. & K. Looms** 72"—20 harness dobbies, 4x1 Box Automatic.
15—**C. & K. Looms** ¾ Axm. Carpet, complete overhead equipment.
5—**C. & K. Looms** 12/4 Tapestry Velvet, with Jacquards.
1—**P.&W. Semi-Decating Mach.,** for Knit Goods.
1—**Gessner Full Decating Machine,** 72" Complete with Winding.
1—**Heathcote Cloth Dryer,** 80" 120 yds.
1—**Cooling and Conditioning Machine,** all metal.
1—**Tolhurst Extractor,** 48" Copper Basket, Motor Drive.
1—**C. & M. 4-cyl. Sand. & Polish. Mach.,** 66½".
1—**P & W. Shear,** Double Cyl. 66½" Model A.
1—**Voelker Rolling & Measuring Machine,** 62½" 100 yds.
1—**Arlington Crab** 6-Bowl ¾ wide.
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3—**Franklin Process Package Dying units,** complete with Dryers, Winders & Extractor. 1—250 lb. 1—500 lb. 1—50 lb.
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(See also Opportunity Offered)

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POSITIONS WANTED

FIRST CLASS DYER on piece goods can handle acid union direct acetate and bathing suits, colors, 15 years' experience. Married, age 37. Best references. PW-17, Textile World, 330 West 42nd Street, New York City.

REDUCE PERCENTAGE of seconds and improve quality of product. Superintendent with over forty years' experience in cotton carding, spinning, designing, and weaving desires position with manufacturer of cotton, rayon, or silk fabrics. PW-30, Textile World, 330 West 42nd Street, New York City.

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Selling Agent with established trade is open to represent Spinner of Commercial Wool, Merino, Rayon and Novelty blends Knitting Yarns in Philadelphia and New York, on a commission basis.

RA-43, Textile World
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FOR THE TEXTILE INDUSTRY

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PW-42, Textile World
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WANTED

WANTED

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W-39, Textile World
330 West 42nd St., New York City

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FOR SALE — WANTED
FOR RENT

WANTED

Quantity Wildman 28 Cut Circular Knitting Machines, suitable for Rayon Underwear Fabrics in 12, 13, 14, 17 and 26 inch cylinder size.

W-47, Textile World
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or Business
"Opportunity"

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SUBSIDIARY		
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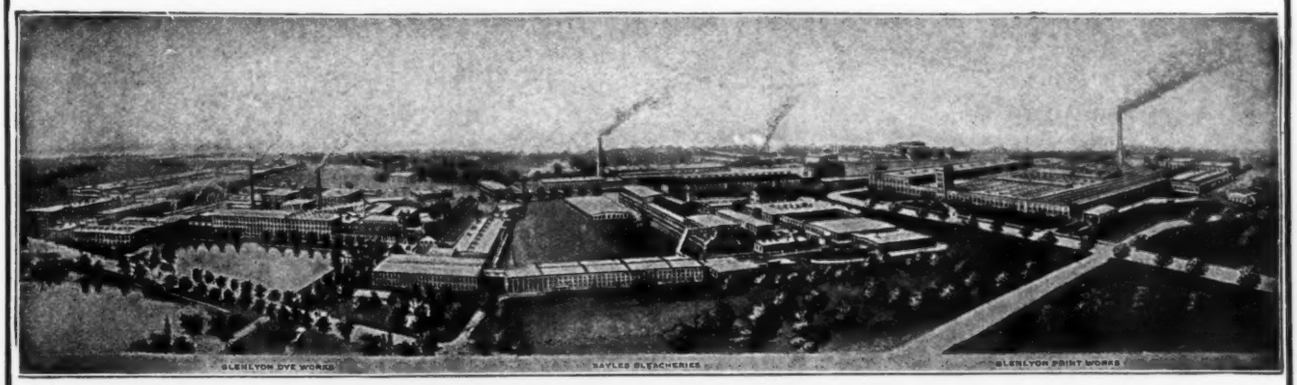

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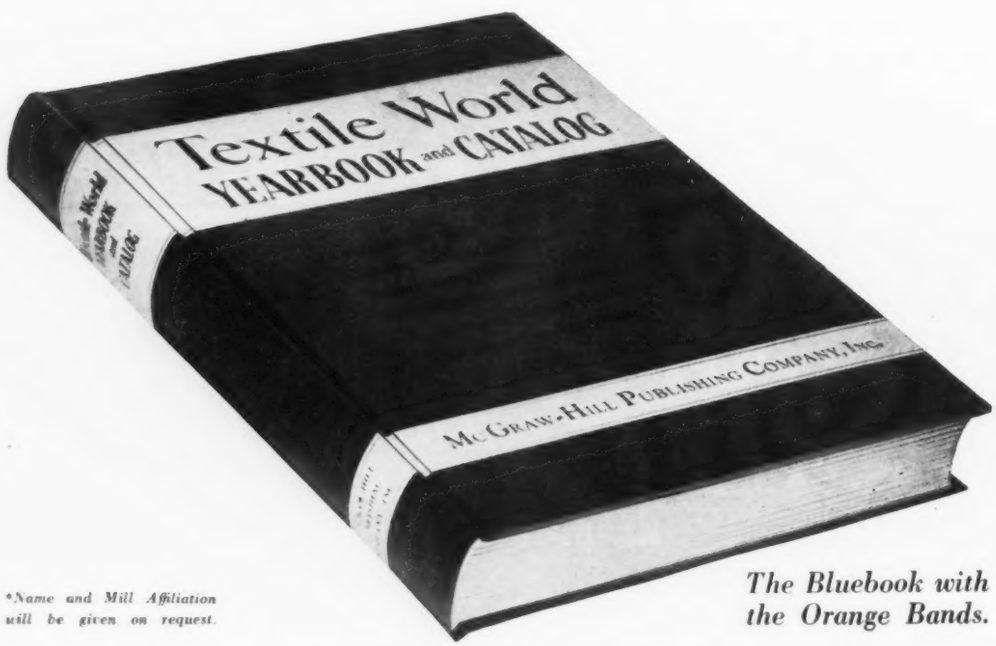
That's why we say—"whenever you need product, service or mill operating data 'look it up first' in the Textile World Yearbook and Catalog."



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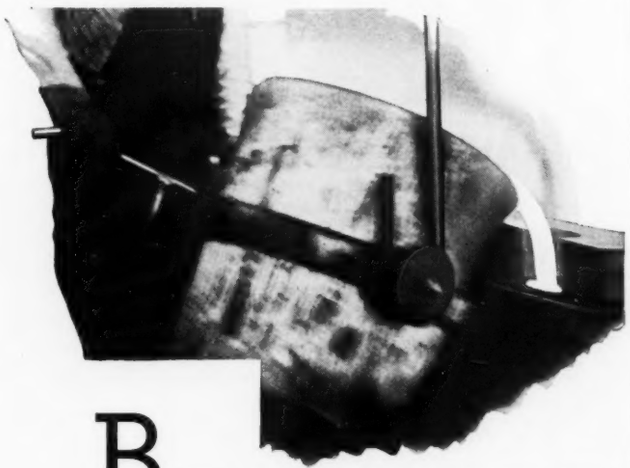
**Name and Mill Affiliation will be given on request.*

A Complete Bearing Service



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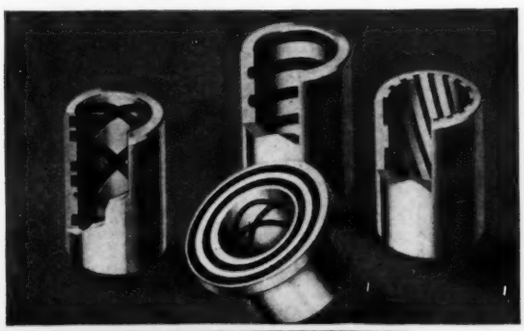

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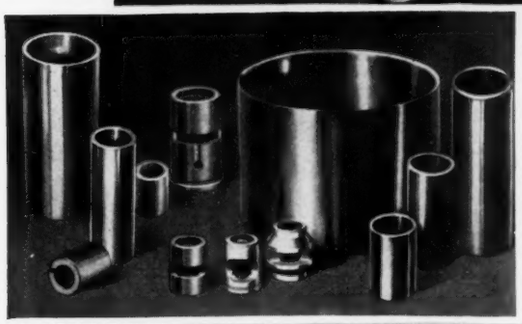

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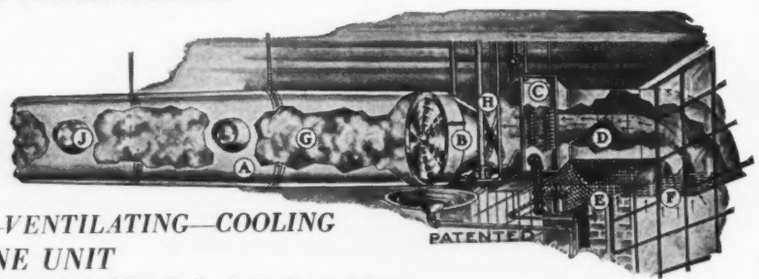
THE BAHNSON HUMIDUCT



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- Give them a reprint of the 40-page Employer-Employee Relations section of this issue of

Textile World

For details see page 198.

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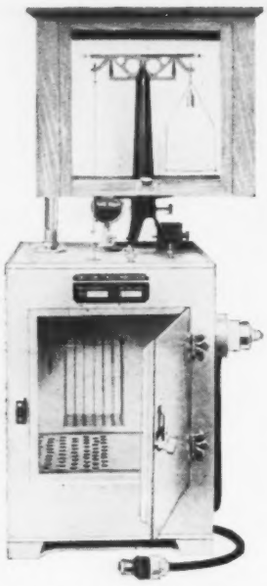

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with one basket 4" x 4" x 6", for the small mill.

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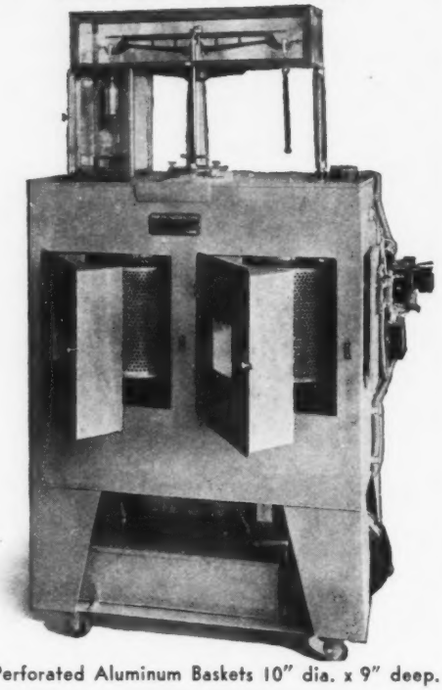

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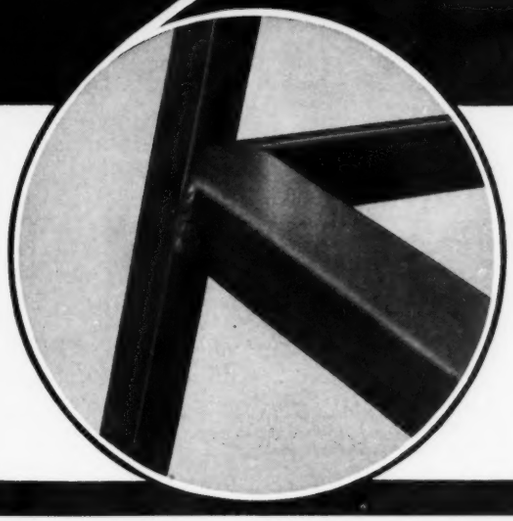

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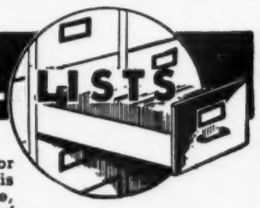

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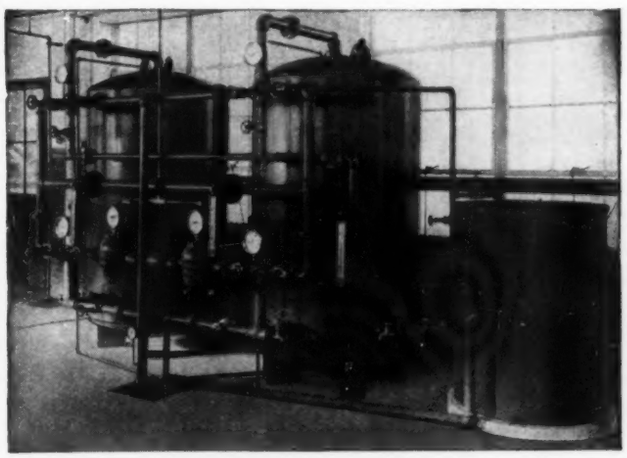

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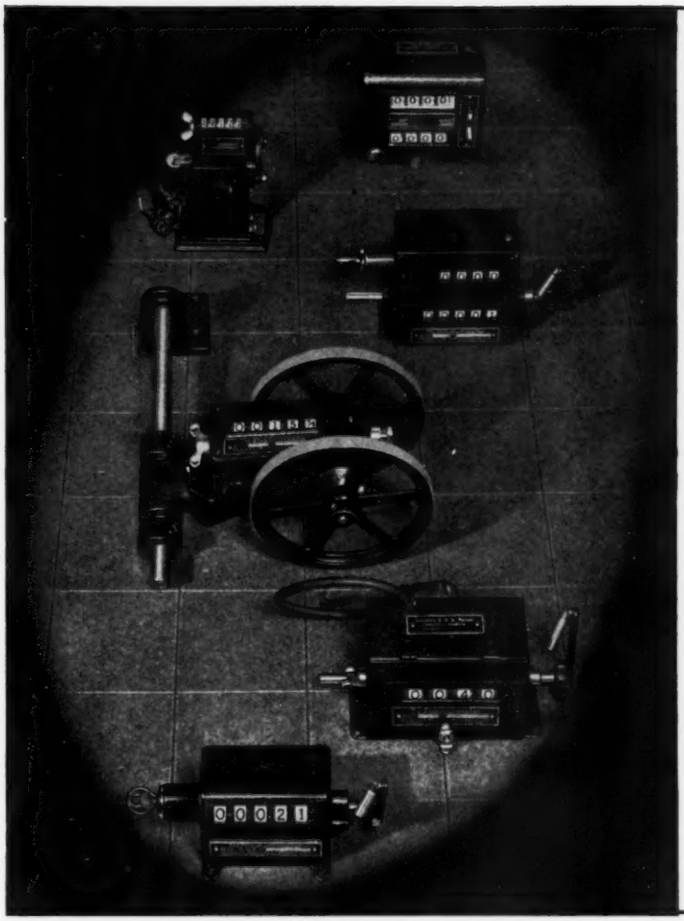

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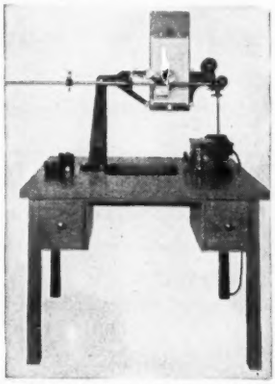

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one of the many

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made by

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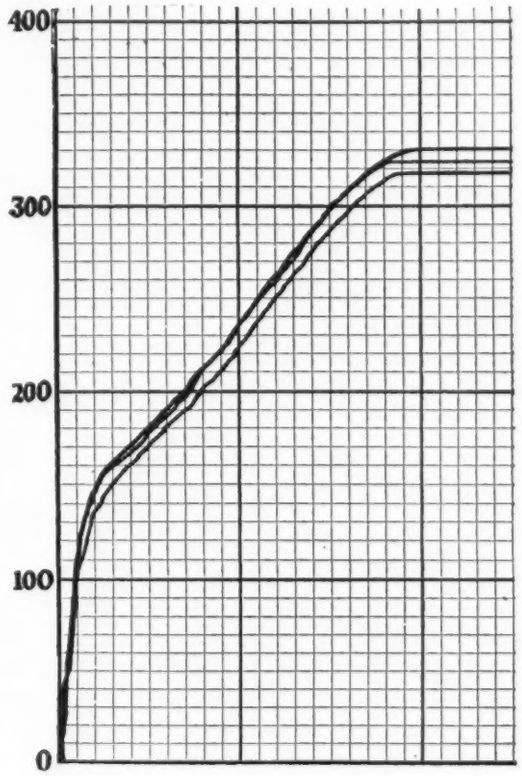

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INDEX TO ADVERTISERS

An * indicates more complete data will be found in 1937 Textile World Yearbook and Catalog.

	Page
Acme Knitting Machine & Needle Co.	166
Albany Felt Co.	151
*Allis-Chalmers Mfg. Co.	147
American Crayon Co., The	132
American Credit Indemnity Co.	150
American Hard Rubber Co.	30
American Lumber & Treating Co.	152
*American Mono Rail Co.	26
American Rolling Mill Co.	135
American Viscose Corp.	137
American Woolen Co.	156
American Yarn & Processing Co.	45
*Andrews & Goodrich, Inc.	16
Angle Steel Stool Co.	166
Arlington Mills	136
Armour & Co.	48
*Arnold-Hoffman & Co., Inc.	171
Atlas Electric Devices Co.	134
*Atwood Machine Co.	78
*Bahnson Co., The	192
*Barber-Colman Co.	Inside Front Cover
Barnes Textile Associates	130
Blickman, Inc. S.	193
Brinton Co., H.	165
*Brown Instrument Co.	23
Bunting Brass & Bronze Co.	191
*Butterworth & Sons Co., H. W.	10
Cidega Machine Shop, Inc.	162
Clinton Company	121
Cole Mfg. Co., R. D.	192
Colgate-Palmolive-Peet Co.	36
Collins & Aikman Corp.	160
Columbia Alkali Corp., The	50
*Commercial Credit Co.	22
Commercial Factors Corp.	Back Cover
Cone Export & Commission Co.	153
*Continental-Diamond Fibre Co.	125
Cooper Co., Chas.	162
Cramerton Mills	136
*Crane Co.	47
*Crane Mfg. Co.	167
Cranston Worsted Mills	160
Dana Warp Mills	160
*Dary Ring Traveler Co., The	154
*Davis & Furber Machine Co.	159
Deering Milliken & Co., Inc.	158
Diamond Alkali Co.	25
*Dinsmore Mfg. Co.	162
Dixie Mercerizing Co.	77
*Dixon Lubricating Saddle Co.	160
Domestic Egg Products, Inc.	174
*Dommerich & Co., L. F.	11
*Draper Corporation	3
*du Pont de Nemours & Co., Inc., E. I	
Dyestuff Div.	15
Fine Chemicals Div.	141, Inside Back Cover
Finishes Div.	138, 139
Organic Chemicals Dept.	15
R. & H. Chemical Dept.	6
*Durant Mfg. Co.	197
Eastern Commercial Travelers Assoc.	132
*Economy Baler Co.	189
Electro Bleaching Gas Co.	173
Emerson Apparatus Co.	194
Falls Yarn Mills	161
*Fletcher Works	24
*Foster Machine Co.	32
Fostoria Pressed Steel Corp.	166
Franklin Machine Co.	166
*Franklin Process Co.	7
Fulton Sylphon Co.	49
*Gardinol Corp.	Inside Back Cover
General Coal Co.	42
General Dyestuff Corp.	169
*General Electric Co.	9
Gilmer Co., L. H.	143, 144
Globe Dye Works Co.	159
Grinnell Co., Inc.	51
*H & B American Machine Co.	28
Hardy, Frank H.	150
Heineman Corp., Oscar	155
Henry, Andrew K.	161
Hercules Powder Co.	168
*Hermas Machine Co.	154
*Houghton & Co., E. F.	29
*Hunter Machine Co., James	27
*Hurley-Johnson Corp.	193
Hyatt Bearings Div. Gen. Motors Corp.	40
International Nickel Co., Inc.	17
*Ives Co., L. T.	164
Jasper-Groz Needle Co., Inc.	166
*Johnson & Bassett, Inc.	128
Keever Starch Co., The	172
*Kenyon & Son, D. R.	194
Kydo Mothproofing Corp.	174
Lane & Bros., Inc., W. T.	192
*Laurel Soap Mfg. Co., Inc.	43
*Link-Belt Co.	4
Loper Co., Ralph E.	192
Lunkenheimer Co., The	34
*Maguire & Co., Inc., John P.	121
Manhattan Rubber Mfg. Div.	35
*Mathieson Alkali Works, Inc.	52
*Merrow Machine Co., The	164
*Miller Co., Wm.	193
Monomac Spinning Co.	136
Montgomery Co., The	136
Murdock & Geb Co.	160
National Aniline & Chemical Co.	Inside Back Cover
National Supply Co., The, Superior Engine Div.	44
Naumkeag Steam Cotton Co.	160
New England Butt Co.	194
N. Y. & N. J. Lubricant Co.	158
Niagara Alkali Co.	173
*Noone's Sons Co., Jos., The	157
*Norma-Hoffmann Bearings Corp.	142
Oakite Products, Inc.	174
Page Fence Association	126
*Paramount Textile Machinery Co.	124
*Parks-Cramer Co.	39
Pennsylvania Salt Mfg. Co.	149
Pequot Mills	160
*Perkins & Sons, Inc., B. F.	18
*Philadelphia Quartz Co.	172
Procter & Gamble	129
*Proctor & Schwartz, Inc.	127
Providence Drysalters Corp. Div. Hercules Powder Co.	41
Provident Life and Accident Ins. Co.	119
*Pure Oil Co., The	192
Republic Steel Corp.	54
Revertex Corp. of America	168
Rhode Island Tool Co.	194
*Roberts Filter Mfg. Co.	195
Royle & Sons, John	161
Ryerson & Sons, Inc., Joseph T.	130
*Saco-Lowell Shops	8
*Sargent's Sons Corp., C. G.	131
Sayles Finishing Plants, Inc.	189
*Scholler Bros., Inc.	170
*Scott Co., H. L.	197
Sherwin-Williams Co.	33
SKF Industries, Inc.	133
*Solvay Sales Corp.	170
*Sonoco Products Co.	200
Standard Pressed Steel Co.	195
State of North Carolina	191
Steel Heddle Mfg. Co.	19, 20
Stephenson, Harry	152
Sterling Ring Traveler Co.	159
Tallapoosa Mills	136
*Taylor Instrument Companies	146
Tennessee Eastman Corp.	75
Texas Co., The	12, 13
Thomas & Skinner Steel Product Co.	166
Tolhurst Centrifugal Div. American Machine & Metals, Inc.	21
*Tompkins Bros. Co.	164
*Torrington Co., The	37, 38
Tubize Chatillon Corp.	145
*U. S. Ring Traveler Co.	148
*Universal Winding Co.	76
Victor Chemical Works	174
*Warp Compressing Machine Co.	14
Waterman Currier & Co., Inc.	156
Wayne Mfg. Co.	161
Weimar Bros.	161
Westinghouse Electric & Mfg. Co.	31
Westinghouse Lamp Div. Westinghouse Electric & Mfg. Co.	46
Westinghouse Electric & Mfg. Co. (Water Cooler Division)	140
*Whitinsville Spinning Ring Co.	161
Whitlock Coil Pipe Co.	120
Whitman Co., Inc., Wm.	136
Wildman Mfg. Co.	163
Willey & Co., Francis	158
Wilson Co., Inc., Charles T.	174
Wolf & Co., Jacques	5
Wolstenholme Sons & Co., Inc., Thos.	160
Wood's Sons Co., T. B.	122, 123

■ ■ ■

PROFESSIONAL SERVICES

Barnes Textile Associates	130
Loper Co., Ralph E.	192
Polachek, Z. H.	188
Saxl, Dr. Erwin J.	188

■ ■ ■

SEARCHLIGHT SECTION

Classified Advertising

BUSINESS OPPORTUNITIES	188
EMPLOYMENT SERVICE	
Raymond Service, Inc., Chas. P.	188
MILLS WANTED	188
POSITIONS VACANT	188
POSITIONS WANTED	188
SELLING OPPORTUNITIES	188
WANTED TO PURCHASE	188
USED AND SURPLUS EQUIPMENT	176-187
Ambler Textile Machy. Co.	184
Amoskeag Industries, Inc.	186
Bay State Textile Co.	184
Bradford, Roy H.	186
Cady, A. J.	184
Collins & Aikman Corp.	186
Consolidated Products Co., Inc.	183-185
French, C. M.	185
Fyans, A. F.	185
Gaines Textile Machinery Co.	180
Ginsberg, C. I.	180
Green-McCord Corp., Edwin Farnham	178
Horton, Harold W.	185
Howe Brothers	187
Industrial Plants Corp.	184
Kerwin, Michael	186
Langevin, Geo. F.	184
Machinery Liquidating Co.	179
McCloskey, Inc., John J.	186
McKittrick, Inc., Frank G. W.	176-177
Marshall's, Inc.	187
National Machinery Co.	187
O'Brien Machinery Co.	187
Paterson Silk Machinery Ex., Inc.	187
Pernick Co., Inc., Joseph	186
Slaybaugh, James	186
Solomon & Co., Inc., Robert	181
Standard Mill Supply Co.	183
Stanhope, Inc., R. C.	186
Stephenson, Harry	182
Upchurch & Sons, Inc., C. L.	185
Wheeler, Frank W.	182
Williams	186
Windle & Co., J. H.	184

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